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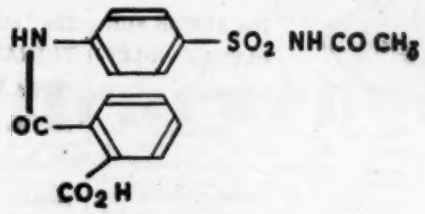

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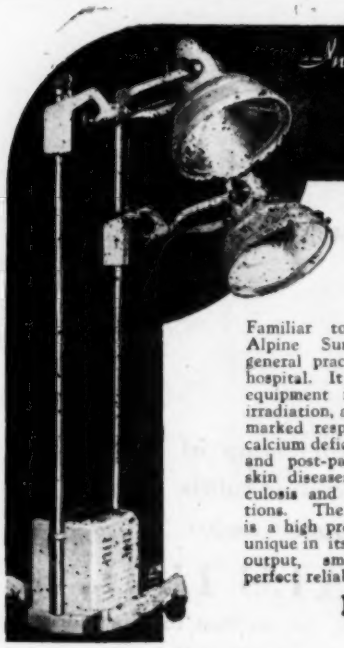

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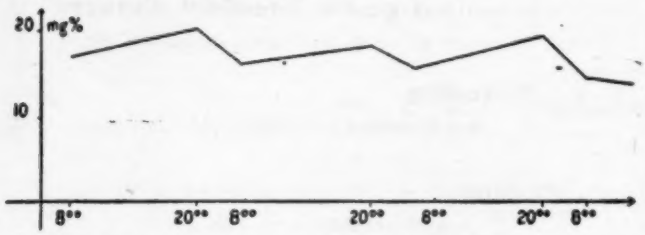

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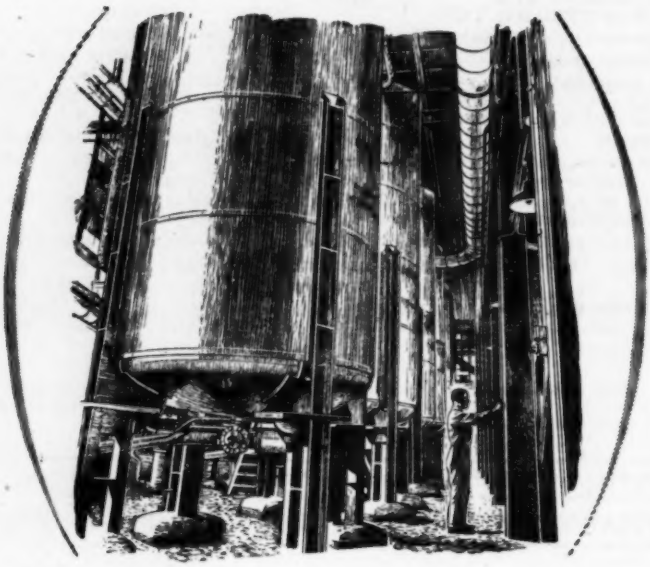

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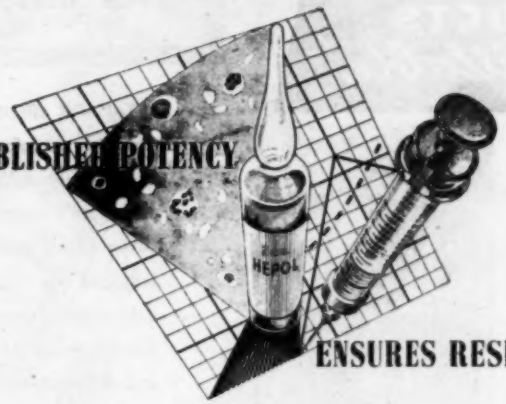

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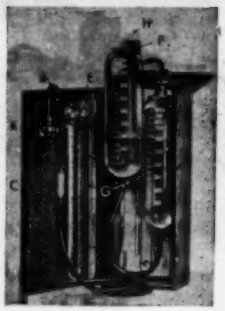

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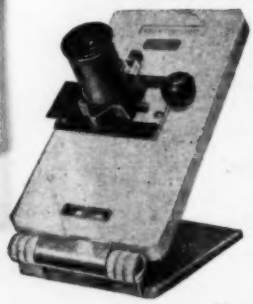

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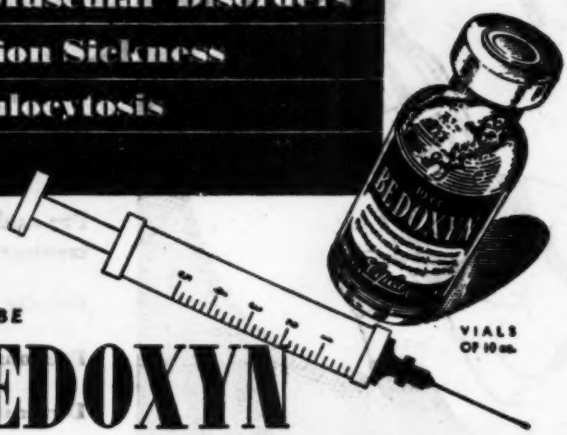

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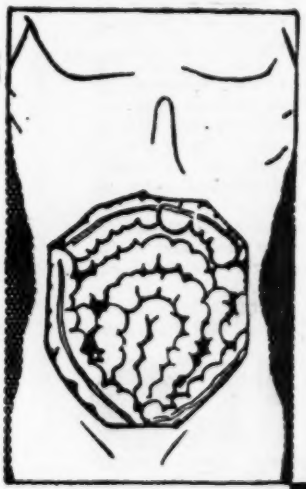

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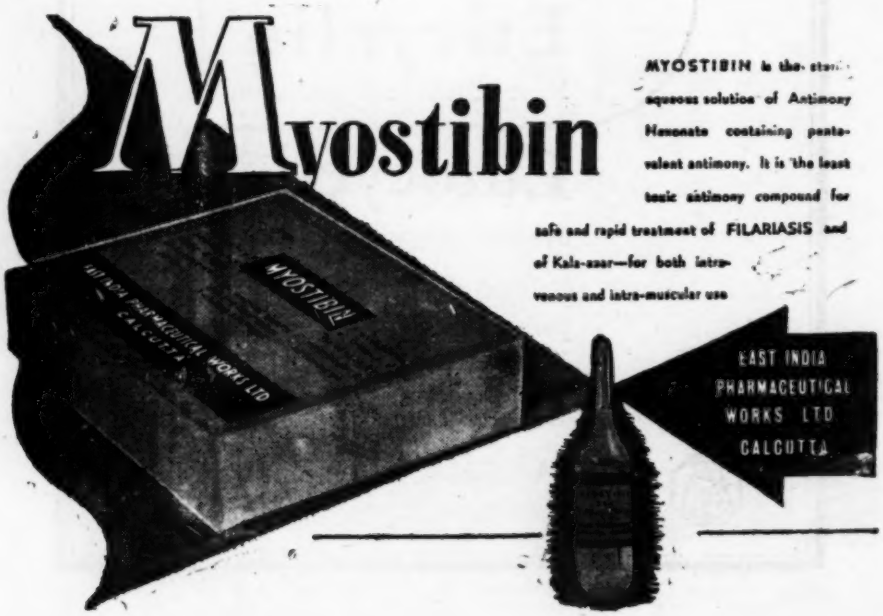

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ORIGINAL ARTICLES

A STUDY ON THE CIRCULATING BLOOD VOLUME UNDER ANAESTHESIA*

1. NORMAL VALUES

PURNIMA CHATTERJEE, M.B.B.S.,
Calcutta

The importance of quantitative estimation of blood volume in health and disease has been established for a long time. A knowledge of the total volume of blood which fills the cardiovascular system under various conditions helps in a better understanding of variations in clinical findings such as blood pressure and blood count.

The estimation of blood volume even in semiquantitative sense has its significance. It helps in two ways:

(*a*) Calculation of the total quantities of various constituents of blood. The routine estimation of the percentage of hæmoglobin, erythrocytes and plasma proteins etc., in a specimen of blood does not give the full indication of the total amount of hæmoglobin, cell mass and plasma protein, unless the total blood volume is also considered along with it. As for example, the hæmatocrit reading of a case of polycythæmia and a case of shock after burns may show the same value, but the hæmodynamics are different in the two cases. The total blood volume is much larger in the former whereas it is much reduced in the latter. The circulating condition in the former is normal, while there is a great hæmoconcentration in the latter demanding early therapeutic action.

(*b*) Estimation of the arterial pressure though widely used as the guide to the state of the hæmodynamics of the body is an inadequate guide to the complete picture of the state of circulation during any circulatory disturbance of the body, such as shock, cardiac failure etc. A knowledge of the volume of blood and its distribution provides insight into the nature and severity of the altered circulatory process which involves changing relation between vascular capacity, volume and rate of blood flow.

The potential value of the determination of blood volume in diagnosis, prognosis and treatment of various altered states of circulation of the body such as shock hæmorrhage, etc., has been enhanced by the reported results of various workers on this subject. Since the reduction of blood volume precedes the appearance of symptoms of shock it constitutes a valuable prodromal sign, and early determination of the blood volume may, therefore, help in the early dispensation of resuscitative methods. It may prove to be a useful method of diagnosis of impending shock. Also a routine examination of the blood volume during a course of replacement therapy prevents a subject from over and unwanted hydration thus avoiding the risk of inducing heart failure and pulmonary œdema. It may also provide a reliable guide to the exact nature of requirement. The knowledge of blood volume is important in chronic and debilitating diseases.

Thus, quantitative estimation of the blood volume has a wide scope in diagnosis of the state of hæmodynamics and consequently helps considerably in the therapeutic medicine.

An observation was made on the normal blood volume in healthy Indians mostly Bengalees, in the course of an enquiry on the circulatory blood volume under anæsthesia under the auspices of Indian Council of Medical Research. The normal standard is essential for correct interpretation of the blood volume and its diagnosis of deviation from normal.

METHOD AND MATERIALS

From the direct method of bleeding by Welcker (1854) in animals and Bischoff (1856) in decapitated criminals (both quoted by Best and Taylor in the Physiological basis of Medical Practice) the method of estimation of blood volume has undergone various modifications and improvement. The methods evolved successively in the past to the present stage of development are, dilution of the blood after large intravenous infusion (Erlanger, 1921), replacement method (Erlanger, 1921), methods for measuring plasma volume from the dilution of slowly diffusible foreign proteins (Von Behring, 1912; Culbert-

* This study was undertaken under the guidance of Dr. P. Chatterjee, Professor of Surgery, Medical College, Calcutta. It was supported by a grant of fellowship from Indian Council of Medical Research.

son, 1934; Madsen, 1936), vital dyes (Keith *et al.*, 1951), gum acacia Meek *et al.*, 1916-19), hæmoglogin (Barral *et al.*, 1909; Lee *et al.*, 1921), carbon monoxide (Haldane, 1899; Grehaut, 1882), and lastly radio-active isotopes (Hann and Heven, 1940; Hann, 1942; Anderson, 1942). Of these, the dye method is simple and suitable for routine clinical purposes. Some of the inherent defects of the dye method have been eradicated by the use of suitable dye with the help of various types of accurate colorimeters, spectrophotometer and photo-electric colorimeters. Though the dye method still suffers from some limitations as seen from the controversies over exact mixing time, criteria of uniform mixing time, change of mixing time in various circulatory conditions, yet the bulk of the experimental work on the blood volume was done with this method. This method has been recommended by authorities like Gregersen and others after several years' work on various aspects of the dye method (Gregerson, 1938; Gregerson, 1944; Gregerson and Gibson, 1937; Gregerson *et al.*, 1935; Gregerson and Rawson, 1943; Gregerson and Schiro, 1938) and on different types of experimental shock in animal and man (Gregerson and Schiro, 1938; Gregerson and Stewart, 1939; Brown and Hopper, 1949; Noble and Gregerson, 1946; Syderhelm, 1923; Rusznyak, 1927). Gregerson is of opinion that the limit of error introduced by the simplified method used on man can be defined and this error is negligible in comparison with the reduction of blood volume obtained in altered circulatory conditions such as shock.

MATERIALS: The subjects were the indoor patients, both male and female, admitted under the Professer of Surgery, Medical College Calcutta for minor surgical operations. Any subject showing evidence of circulatory disturbances or other illness which might interfere with the result was excluded. As the conditions of the subjects (digestion, activity etc.,) influence the plasma volume they were kept at a basal condition of 16 hours bed rest including 8 hours sleep. The blood volume was determined in the morning before breakfast to avoid the haziness of serum after meal. 154 subjects, 115 males and 39 females, were examined.

METHOD: The original technique of Gregerson (1944) has been followed with some modification.

Dye solution—The dye used is Evans' blue (T-1824) in 0·7 per cent solution (*i.e.*, 2·1 gm. of Evans' blue dissolved in 300 c.c. of pyrogen-free redistilled water). The ampoules containing 3 c.c. of the dye solution were sterilised in autoclave under 10 lb. pressure.

Standard dye solution—For the preparation of the standard dye solution (0·5 in 50), 0·5 c.c. of the 0·7 per cent dye is diluted in 50 c.c. of distilled water. This gives a 250 dilution of the 2·5 c.c. of the dye. This standard solution when further diluted ten times with serum (0·1 c.c. of the standard dye solution and 0·9 c.c. of serum) will have a dilution of 2500 of the 2·5 c.c. of dye solution. This is approximately the dilution reached by the 2·5 c.c. dye injected in the body, obtained from the 10 minute sample of blood drawn after the dye injection. The dilution of the standard and unknown should be approximately equal (Beers Law). The standard solution should be made according to the amount of the dye injected.

Procedure—6 c.c. blood was drawn to serve as control from one of the antecubital veins; 3 c.c. of the blood was transferred into an anticoagulant mixture and the other half was used for serum. An accurately measured amount of 2·5 c.c. of the Evans' blue was injected through the same needle into the vein. This accurate measuring is brought about by marking the syringe. This dye syringe was rinsed several times with blood to inject all the dye as far as possible. The time of the injection was noted. Exactly after 10 minutes another sample of 6 c.c. of blood was drawn from the opposite antecubital vein to serve as the unknown, and half of this amount was collected in an anticoagulant mixture and the other half in a dry test tube for serum.

A few precautions adopted to avoid the errors of the dye method:

To do away with the effect of momentary stasis; no tourniquet was applied at the time of drawing the blood. The vein was just made prominent by a little pressure on the arm before the needle of the syringe was pushed in and an interval of half a minute was allowed, before drawing in of the blood into the syringe. Only sterile, dry syringes and needles were used. The needles were well-fitted to the syringe. Hæmolysis was avoided by moistening the plunger of the syringe with sterile liquid paraffin before drawing the blood. All precautions were taken to avoid any spillage of dye outside the vessel and hæmolysis of the drawn blood.

Laboratory procedure—The hæmatocrit values were determined by centrifuging the two samples of blood in anticoagulant at a high speed (3,000 r.p.m.) centrifuge for 30 minutes. The serum from the two samples were collected; one was dye-free serving as control and the other, the 10 minutes sample, was used as the unknown. A standard solution was prepared with 0·1 c.c. of standard dye solution and 0·9 c.c. of the dye-free serum in a test tube. One c.c. of the dyed serum was taken in another test tube. Both the samples were diluted with 5 c.c. normal saline and read in a photo-electric colorimeter (Leitz) with a red filter 620mμ. The optical densities of the solutions were recorded on the dial. The optical densities were converted to extinction values from a line chart and table. If E_1 and E_2 were the reading of extinction values of the control and unknown samples respectively and P was the plasma volume in ml. then

$$P = \frac{E_1 \times 2{,}500 \text{ (dilution)}}{E_2}$$

Blood volume was determined from the plasma volume and the hæmatocrit ratio obtained. If H be the relative hæmatocrit reading in 100 c.c. of blood; then

$$\text{Blood volume} = \frac{\text{Plasma volume} \times 100}{100 - H}$$

To avoid the limitation of the dye method and to have the optical densities of the samples as close to each other as possible, the following procedures were carefully followed. The serum of the control and the unknown were made identical in every respect except for the dye present in the latter. A fresh control was taken every time from the same subject. This avoided the colouring material of the serum which would have been present in both the samples and the change that might have occurred during the 10 minutes interval is negligible. This can also be checked with serum protein test (copper sulphate method—Van Slyke) for the stasis of the blood during the time of drawing.

The hæmolysis and lipæmia may interfere with the result but these should be prevented as far as possible.

In a normal circulatory condition the dye is mixed up in 10 minutes' time and the dye lost from the circulation during this time is very negligible. Gregerson (1944) and Noble and Gregerson (1946) found by comparative study of 10 minutes' sample with extrapolation method a slight difference in readings (−2 to +4 per cent of plasma volume) but this is of no clinical significance. He observed that though the single dye-tinged sample drawn at 10 minutes' method should be used with discretion it is valid for normal subjects and subjects who have suffered from injury from hæmorrhage, trauma and burns.

Results

The average values for male and female Indians are tabulated (Table 1). The average plasma volume of 115 male subjects is 48·61 ml. per Kg., the standard deviation being ± 10·094. The blood volume and cell volume are 84·58 and 35·72 ml. per Kg., the standard deviations are ± 11·768 and ± 7·7408 respectively. Similarly, the average values of plasma, blood and cell volume in 39 female subjects are 51·48, 83·26 and 32·02 ml. per Kg. The standard deviations are ± 5·47, ± 11·22 and ± 6·006 respectively. Statistical comparisons on the averages of plasma, blood and cell volumes between the sex groups are made and shown in the Table 1 (*a*). Except for the cell volume, the sex groups do not differ significantly in other respects.

Table 1

	No. of cases		*Plasma volume ml./kg.*	*Blood volume ml./kg.*	*Cell volume ml./kg.*
Male	115	Range	32·0—66·8	60·0—111·8	20·9—47·5
	$\sqrt{115} = 10.72$	Mean	48·61	84·58	35·72
		σ	± 10·094	± 11·768	± 7·7408
		$\sigma/\sqrt{n}$	± 0·941	± 1·097	± 0·722
Female	39	Range	37·3—67·5	61·3—110·6	22·5—46·7
	$\sqrt{39} = 6.24$	Mean	51·48	83·26	32·02
		σ	± 5·4799	± 11·22	± 6·006
		$\sigma/\sqrt{n}$	± 0·878 no "s"	± 1·79 no "s"	± 0·964 "s"
Total	154	Mean	49·33	84·25	34·78
		σ	± 9·1027	± 11·6146	± 6·4845

Table 1(*a*)

	Difference of the means of the sex groups	*Standard error of the difference*	*"t"*	*Degree of freedom*	*Remark*
Plasma volume per kg. ...	2·87	1·706	1·68	152	Not significant.
Blood volume per kg. ...	1·32	2·170	0·608	152	Not significant.
Cell volume per kg. ...	2·70	1·369	2·70	152	Significant.

The summary of the observations on 154 cases both male and female are given in Table 2 with range, mean value and standard deviations of each variants such as age in years, weight in kilograms, hæmoglobin in grams per 100 c.c. of blood, plasma, blood and cell volume ml. per Kg. The mean values of age, weight, hæmoglobin, plasma, blood and cell volume are 35·03 years, 50·84 Kg., 13·86 gm. per 100 c.c., and 49·33, 84·25 and 34·78 ml. per Kg. respectively.

TABLE 2

Total No. (n) ... 154	*Age*	*Weight in kg.*	*Hæmoglobin in gram.*	*Plasma volume in ml./kg.*	*Blood volume in ml./kg.*	*Cell volume in ml./kg.*
Range	7—75	27·7—82·7	8·5—19	32·0—67·5	60·0—111·8	20·9—47·5
Mean	35·03	50·84	13·86	49·33	84·25	34·78
Standard deviation ... σ	±11·945	±10·927	± 3·1764	± 9·1027	±11·6146	± 6·4845
Standard error of Mean $\frac{\sigma}{\sqrt{n}}$	± 0·963	± 0·881	± 0·256	± 0·734	± 0·936	± 0·522
True Mean ... ... $M \pm 2(\frac{\sigma}{\sqrt{n}})$	35·03 ± 2(0·963)	50·84 ± 2(0·881)	13·86 ± 2(0·256)	49·33 ± 2(0·734)	84·25 ± 2(0·936)	34·78 ± 2(0·522)

The relations of plasma, blood and cell volume with unit of body weight are given in Table 3. The graphs and charts are constructed by applying the average values obtained from measurement of healthy men and women to entire range of body weight and hæmoglobin percentage of blood. The charts are, therefore an approximation but greater refinement does not seem justifiable until large series of measurements made with the same technique, become available. Body weight rather than surface area has been chosen for the abscissæ in Figs. 1 and 2 for simplicity in utilising the charts. The plasma and blood volumes are somewhat greater in lean than in fat individuals. The relative values of hæmoglobin in gm. per 100 c.c. and plasma, blood and cell volume are charted in Table 4 and depicted in Figs. 3 and 4. The plasma and blood volume decrease with the increase of hæmoglobin in the blood whereas cell volume increases with the increase of hæmoglobin in the blood. The values of plasma, blood and cell volume against the different age groups are given in Table 5.

TABLE 3

Weight in kg.		*No. of cases*	*Plasma volume in ml./kg.*	*Blood volume in ml./kg.*	*Cell volume in ml./kg.*	*Plasma volume/kg. / Blood volume/kg.*	*Cell volume %*
20-30	M	1	60·1	92·9	32·8	1·54	35·3
30-40	$\frac{M}{\sigma}$	26	$\frac{56·75}{\pm 6·6502}$	$\frac{91·12}{\pm 11·4068}$	$\frac{34·37}{\pm 6·7607}$	1·60	39·8
40-50	$\frac{M}{\sigma}$	58	$\frac{51·59}{\pm 7·5023}$	$\frac{86·16}{\pm 10·1087}$	$\frac{34·57}{\pm 6·7174}$	1·67	35·9
50-60	$\frac{M}{\sigma}$	36	$\frac{48·28}{\pm 8·9947}$	$\frac{84·97}{\pm 9·8856}$	$\frac{36·69}{\pm 3·6649}$	1·75	43·1
60-70	$\frac{M}{\sigma}$	26	$\frac{41·25}{\pm 3·9661}$	$\frac{74·88}{\pm 8·4046}$	$\frac{33·63}{\pm 5·5946}$	1·81	44·9
70-80	M	2	38·9	73·1	34·2	1·87	46·7
20-80		143	Correlation Co-efficient (r) Weight : Plasma volume per kg. = −0·483				

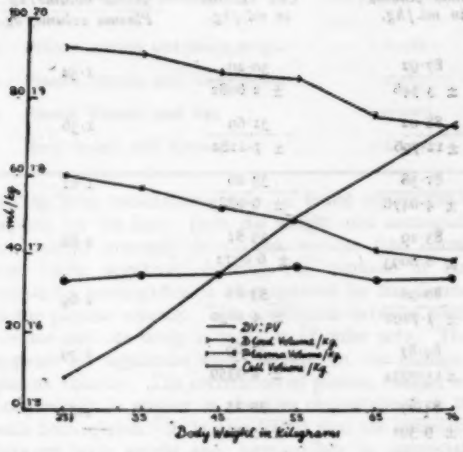

FIG. 1—Body Weight in Kg. :: Plasma, Blood and Cell Volume/Kg.

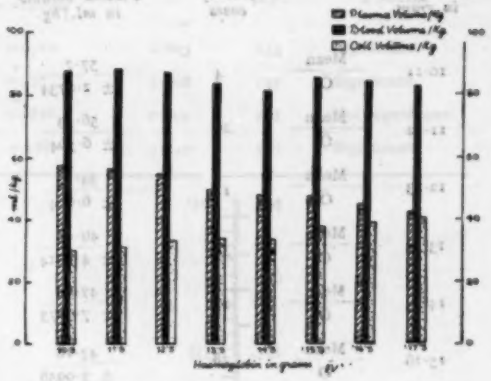

FIG. 3—Hæmoglobin :: Plasma, Blood and Cell Volume/Kg.

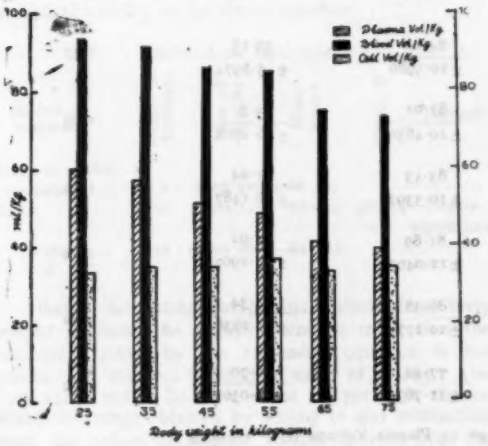

FIG. 2—Body Weight in Kg. :: Plasma, Blood and Cell Volume/Kg.

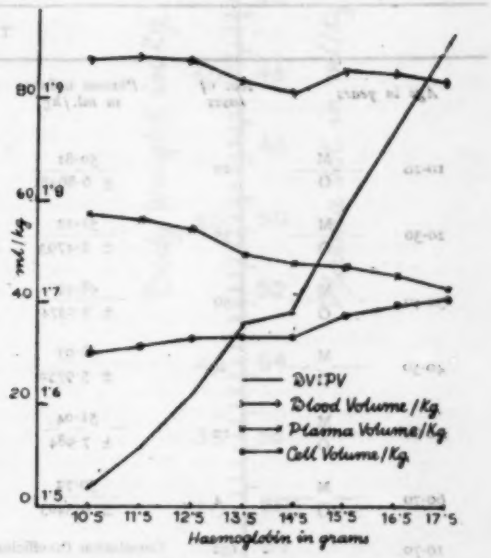

FIG. 4—Hæmoglobin in Grams :: Plasma, Blood and Cell Volume/Kg.

TABLE 4

Hæmoglobin in gram		No. of cases	Plasma volume in ml./kg.	Blood volume in ml./kg.	Cell volume in ml./kg.	Blood volume/kg. / Plasma volume/kg.
10-11	Mean / O	4	57·7 / ± 2·0734	87·92 / ± 3·546	30·20 / ± 2·6082	1·52
11-12	Mean / O	20	56·33 / ± 6·564	88·02 / ± 12·796	31·69 / ± 7·2182	1·56
12-13	Mean / O	11	54·12 / ± 6·004	87·38 / ± 4·0476	33·26 / ± 6·6883	1·61
13-14	Mean / O	30	49·48 / ± 4·0314	83·29 / ± 8·8093	33·81 / ± 6·0312	1·68
14-15	Mean / O	24	47·64 / ± 7·0773	80·96 / ± 7·7292	33·82 / ± 4·2830	1·69
15-16	Mean / O	28	47·18 / ± 5·9958	84·87 / ± 11·0554	37·69 / ± 4·9359	1·79
16-17	Mean / O	15	45·02 / ± 5·6444	84·27 / ± 9·391	39·25 / ± 5·193	1·87
17-18	Mean / O	5	42·2 / ± 4·579	82·52 / ± 7·7656	40·32 / ± 3·5118	1·95
10-18		137	Correlation : Hæmoglobin : Plasma Volume Co-efficient (r) = −0·285			

TABLE 5

Age in years		No. of cases	Plasma volume in ml./kg.	Blood volume in ml./kg.	Cell volume in ml./kg.	Blood volume/kg. / Plasma volume/kg.
10-20	M / O	22	50·81 / ± 6·8638	84·00 / ± 10·5986	33·15 / ± 5·8974	1·57
20-30	M / O	35	51·22 / ± 7·4793	87·02 / ± 10·4850	35·8 / ± 6·2968	1·69
30-40	M / O	50	48·49 / ± 7·2374	83·43 / ± 10·3392	34·94 / ± 6·1487	1·72
40-50	M / O	29	46·97 / ± 5·9752	81·89 / ± 12·0497	34·92 / ± 7·2904	1·74
50-60	M / O	12	51·04 / ± 7·984	86·38 / ± 10·2779	35·34 / ± 7·2938	1·72
60-70	M / O	4	50·72 / ± 6·3403	77·42 / ± 11·7633	26·70 / ± 6·0507	1·52
10-70		152	Correlation Co-efficient Age : : Plasma Volume (r) = +0·0003			

These points are further studied statistically by finding out the co-efficient of correlation of plasma volume per Kg. with body weight, hæmoglobin and age. The plasma volume is chosen as one of the variants as it is kept very constant in normal persons, the corpuscular volume, on the other hand, can vary within wide limits so that the blood volume is altered in like manner. The values of the co-efficient of correlation between plasma volume and hæmoglobin, weight and age are shown in the Table 6. Each of these values

TABLE 6

Between variantes	Co-relation	Standard error of co-relation	"t"	D.F.	Remarks
1. Plasma volume and Body weight ...	−0·483	0·0710	6·803	143	Significant.
2. Plasma volume and Hæmoglobin ...	−0·285	0·777	3·668	137	Significant.
3. Plasma Volume and Age	+0·0003	0·0810	0·004	152	Not significant.
4. Body weight and Hæmoglobin ...	+0·254	0·0784	3·240	152	Significant.

having been tested statistically, is found significant excepting for the age. Both the weight and hæmoglobin are related inversely to plasma volume (the correlation being negative) showing the increase in body weight or hæmoglobin is accompanied by the decrease in the plasma volume. The correlation between plasma volume and age being as small as of order zero. There appears no significant effect of age on the change of plasma volume. The correlation of plasma volume with body weight is greater in absolute magnitude than that with hæmoglobin. It is also found that the correlation between body weight and hæmoglobin is appreciable and significant. Therefore, they cannot be taken together as independent factors affecting the plasma volume in their own way. For this, the following regression equation to estimate plasma volume only from body weight, has been constructed.

$$y - 49{\cdot}33 = -0{\cdot}4057\ (x - 50{\cdot}84)$$

where x is body weight in Kg.
and y is plasma volume per Kg.

The following analysis of co-variance stabilises the statistical validity of the above equation.

ANALYSIS OF CO-VARIANCE

Source of variation	Degree of freedom	Sum of squares	Mean square	Obsd. F	Remark
Due to fitted regression ...	1	3008·517	3008·517		
Error ...	152	9886·743	65·044	46·254	Highly significant
Total ... 6	153	12895·260	84·283		

But in estimating the plasma volume from body weight it should be always borne in mind that the estimation given by the regression equation is not precise; but involves a standard error of ± 8·065. The true value would lie with about 65 per cent chance within the range obtained by adding to and subtracting from the value of plasma volume derived from the regression equation, the standard error 8·065.

It is evident that one mean value of plasma volume may not be applicable without certain reservations to all weight groups so for the purpose of ready reference, the nomogram of the regression equation of plasma volume on the body weight is shown in Fig. 5. This is

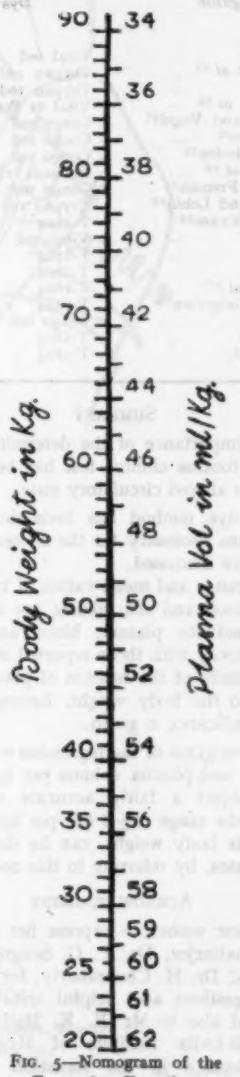

FIG. 5—Nomogram of the Regression Equation.

a nomogram consisting of a single straight line only, graduated on either side. One side reads the body weight in kilogram and the other plasma volume in ml. per Kg.; so that for a given body weight the corresponding point on the other side will read plasma volume. A fairly accurate evaluation of the plasma volume is possible from the nomogram for an emergency purpose when direct determination is not available.

A comperative study of the plasma and blood volume by various investigators at sea level is given in Table 7; these values agree moderately well with those obtained from the present study.

TABLE 7

DETERMINATION OF BLOOD VOLUME IN HEALTHY MAN (BY DYE METHOD) AT SEA LEVEL IN DIFFERENT PARTS OF THE WORLD

Investigator	*Dye*	*No. of cases*	*Plasma volume*		*Blood volume*	
			ml./kg.	*percentage of body wt.*	*ml./kg.*	*percentage of body wt.*
Keith *et al.*[4] ...	... Vital red	48	50	5·1	85	9·0
Syderhelm *et al.*[24] ...	... Trypan red	6	44·1	4·6	84·7	9·0
Rusznyah[25] ...	... Trypan red	8	44·7	4·6	83·3	8·8
Rowntree *et al.*[26] ...	... Vital or Congo red	49	51·0	5·2	88	9·3
Uhlenbruck and Vogel[27]	... Congo red	7	41·4	4·2	79 6	8·4
Menderhansen[28] ...	... Congo red	16	39·0	4·0	71·7	7·6
Spark and Haden[29]	... Congo red	10	34·4	3·5	64 9	6·9
Hurtudo *et al.*[30] ...	... Brilliant vital red	15	47·8	4·9	87·8	9·28
Looney and Freman[31]	... Congo red	29	44·1	4·5	81·4	8·6
Goldbloom and Lebin[32]	... Trypan red	10	40·5	4·1	81·4	8·2
Gibson and Evans[33]	... T-1824	41	44·7	4·6	77·7	8·2
Levin[34]	... Vital red	56	42·0	4 3	78·0	8·2
Halloch[35] ...	... T-1824	10	46·4	4·9	89·5	9·5
Davis[36]	... T-1824	11	40·5	4·2	76·7	8·1
Hurtado *et al.*[37] ...	... T-1824	...	46	4·7	85	8·5
Noble and Gregersen[23]	... T-1824	51	44·7	4·6	85·1	9·0
Dutt[38]	... Congo red	6	48·0	4·9	82·9	8·8
Choudhury[39] ...	... T-1824	50	47·7	4·9	83·1	8·8
Present Study	... T-1824	154	49·33	5·07	84·25	8·91

SUMMARY

1. The importance of the determination of blood volume as a routine clinical test has been emphasised specially in an altered circulatory state.

2. The dye method has been described briefly. The precautions necessary for the successful use of the dye method are discussed.

3. The range and mean values of 154 observations on plasma, blood and cell volume are described. The values obtained for plasma, blood and cell volume agree satisfactorily with those reported in the literature. A statistical study of the relation of plasma, blood and cell volume to the body weight, hæmoglobin and age with their significance is given.

4. A nomogram of the regression equation of body weight in kg. and plasma volume per kg. is given. In a normal subject a fairly accurate value of plasma volume with the range of ±8 ml. per kg. corresponding to a particular body weight, can be determined in 65 per cent of cases, by referring to this nomogram.

ACKNOWLEDGMENT

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TUBERCULOMAS OF THE BRAIN

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Much pessimism exists regarding diagnosis, prognosis, adequate treatment and care of tuberculomas of brain. With the advent of newer antibiotics, especially streptomycin and P.A.S. and more definitive and radical operative procedures, better results are expected to be achieved.

A preliminary report on the treatment of tuberculomas of brain is here presented.

A summary of histories, findings, investigations, treatment and result of eight tuberculomas of brain treated in this institution during the last year is presented in a tabular form.

In the literature, opinion regarding the incidence of tuberculomas of the brain varies considerably. This is not surprising since the incidence of tubercular infection also varies widely in different parts of the world. In India, where tuberculosis is so frequent, the tuberculomas of the brain are also extremely common. 20 per cent of all brain tumours seen during the last year in the department of Neurology and Neurological Surgery of the Christian Medical College at Vellore, South India, were tuberculomas.

There were four tuberculomas in cerebellum and four in cerebrum. They were all affecting the ages between 6 and 25 years. It is very interesting to note that none of these cases of tuberculomas had fulminating caseous pulmonary lesions with cavities. Often in these cases it was possible only to demonstrate healed pulmonary lesions or mildly active fibrotic type of lesion and in a few cases x-ray examination of the lungs did not reveal any tubercular lesion, yet they all had positive Mantoux 1 in 10,000 and high sedimentation rates. All these cases had no fever or very little, at the time of admission into the hospital. The tumour formation by tubercular granulation tissue may not be possible unless the body has acquired sufficient resistance to the organism. At present it is not possible to answer why tuberculomas are formed in brain and elsewhere, similar to metastases in malignancy, without obvious generalized reactions.

The symptom-complexes of all cases of tuberculomas were of expanding lesions of the brain. All the cases mentioned here were of the symptomatic type. The asymptomatic variety is usually encountered only at autopsy. As in all cases of brain tumours these symptoms could be either due to the involvement of the area concerned or due to the pressure locally or by general increase of intracranial tension. They gave moderately short history of complaints, duration being from one month to two years. Usually, the diagnosis was not definite even though suggestive evidences led to a presumptive diagnosis of tuberculoma in four cases. In 12 of Garland and Armitage's cases (1945), the diagnosis was tumour brain, but in only one was a tuberculoma suspected. Out of six operated cases of Buchstein-Adson series (1940), tuberculous nature of the tumour was postulated in three.

None of these cases showed symptoms and signs of meningitis, even though Garland and Armitage (*loc. cit*) estimated that three-fourths of cases of tuberculomas of the brain are clinically silent until meningitis supervenes. They all had marked papilloedema. Often lumbar punctures were not done before ventriculography and operation. The C.S.F. examinations did not show changes expected of tubercular infections; there were no increase of cells; chlorides, sugar and proteins remaining normal.

X-ray of the skull showed evidences of increasing intracranial tension—widening of sutures, increased convolutional markings and thinning of posterior clinoids. Tuberculoma may become visible in roentgenograms of the skull when it becomes calcified. Strom describes the typical appearance as a calcified sphere, with fenestrated walls with specks and streaks of calcium having a tendency to arrange in concentric forms. We were not able to see intracranial calcification in any of these cases.

The localization of the expanding lesion was made

TABLE SHOWING ANALYSIS OF THE EIGHT CASES OF TUBERCULOMAS OF THE BRAIN UNDER REVIEW

No.	*Name*	*Age*	*Sex*	*History of complaints*	*Positive findings*	*Laboratory data*	*X-ray findings and localization*	*Treatment*	*Results*
1.	R...	25	F	Headache since 4 months. Vomiting since 2 months Diplopia and pain in the left eye since 2 months Cough since 2 months. Dimness of vision since 10 days. Occasional fits.	Left lateral rectus paralysis. Ptosis of left side. Diplopia. Paresis of right side of face, upper motor neurone type. *Fundus*: Papillœdema both eyes 5D on right and left eye 7D. Concentric contraction of fields.	Hb. 1·5 gms.%. RBC 4·5 mill. WBC 7,700/cmm. N. 60%. E 2%. L 36%. M 2%. E. S. R. 1st hour: 60 mm. 2nd hr. 100 mm. Mantoux: 1 in 10,000 positive.	X-ray of skull shows slight increase in convolutional markings and slight decalcification of posterior clinoid process. There is a fleck of calcification which by stereoscopic examination appears to be in the bone. X-ray chest shows no evidence of any disease. Ventriculogram shows a space-occupying lesion in the left temporoparietal region.	Left frontoparieto-temporal craniotomy with total removal of the tuberculoma followed by Streptomycin ½ gm. B.D.	No positive neurological finding except slight papillœdema on discharge. Patient doing well.
2.	M...	20	F	Stiffness and pain in the neck since 2 months. Headache and vomiting since 2 months. Fits since 2 months. Dimness of vision since 2 months.	Nystagmus on lateral gaze. Difficulty to look up. Ataxia. Co-ordination of hand poor. *Fundus*: Papillœdema of both eyes 4-5D with hæmorrhages and exudates.	Hb. 11 gms.%. RBC 4·04 mill. WBC 6,800 /cmm. N. 64%. E. 2%. L. 28%. M. 6%. E.S.R. 1st hr. 68 mm. 2nd hr. 103 mm. Mantoux: 1 in 10,000 positive. *C.S.F.* Chlorides: 720 mgms.%. Protein: 50 mgms.%. Sugar: 57 mgms.%. Globulin: trace. Cells: 2/c.mm.	X-ray chest shows a definite area of tuberculous infiltration in the mid-zone of the left lung. Ventriculogram showed bilateral symmetrical dilatation of the lateral and 3rd ventricles. 4th ventricle was not seen.	Suboccipital craniectomy with removal of the tuberculoma followed by Streptomycin: ½ gm. B.D.	Patient doing well.
3.	T...	22	F	Headache; Diplopia; Gradual loss of vision and difficulty in walking since 3 months. Had 4 fits altogether.	No vision in right eye. Left eye pt. can count fingers at 3 metres. *Fundus*: Papillœdema 3D with many flame-shaped hæmorrhages and exudates. Weakness of right arm and leg.	Hb. 9 gm.%. Blood Kahn: Negative. *C.S.F.*: Chlorides: 770 mgms.%. Protein: 130 mgms.%. Sugar: 80 mgms.%. Cells: Nil.	X-ray chest shows a few calcifications in the hilum. Otherwise, there is no abnormality. X-ray skull shows definite evidence of increased intracranial tension. *Ventriculogram* shows a space-occupying lesion in the left parieto-occipital region.	Left occipital craniotomy with complete removal of tuberculoma. Streptomycin ½ gm. B.D.	Patient doing well. No weakness of right side. Vision of both eyes improved markedly.
4.	K...	25	M	Headache and vomiting since 2 years; worse since 20 days. Dimness of vision since 2 months. Loss of hearing on rt. side since 15 days.	Ataxia: Nystagmus on lateral gaze. Vision: can count fingers at a distance of 2 metres. *Fundus*: Papillœdema 4-5D Upper motor neurone type of facial paresis on left; Nerve; deafness on right side.	Hb. 13 gms.%. Kahn: Negative. E.S.R. 1st hour: 105 mm. 2nd hour: 118 mm.	X-ray skull showed evidence of increased intracranial tension. *Ventriculogram* showed bilateral symmetrical dilatation of lateral and 3rd ventricles. 4th ventricle not visualized.	Suboccipital craniectomy with complete removal of tuberculoma. Streptomycin ½ gm. B.D.	Patient doing well.

TABLE SHOWING ANALYSIS OF THE EIGHT CASES OF TUBERCULOMAS OF THE BRAIN UNDER REVIEW—*Contd.*

No.	*Name*	*Age*	*Sex*	*History of Complaints*	*Positive Findings*	*Laboratory Data*	*X-ray findings and Localization*	*Treatment*	*Result*
5.	S...	6	F_o	Fever for 1½ months, which started 2 months before admission. Inability to walk during the fever. Increase in size of head. Loss of vision since 15 days.	Ataxia: Inco-ordination of left hand. Loss of vision of both eyes. Papillœdema of both eyes: 4-5D.	Hb. 8·75 gms.%. W. B. C.: 10,500 per cmm. P. 69%. E 2%. L 29%. E.S.R. 1st hour: 47 mm. 2nd hour: 103 mm. Mantoux 1 in 10,000 (Positive).	X-ray chest shows no abnormality. X-ray skull shows evidence of increased intracranial tension. Ventriculogram showed bilateral symmetrical dilatation of the lateral and 3rd ventricles. 4th ventricle not visualised.	Suboccipital craniectomy and partial removal of tuberculoma. Streptomycin ½ gm. B.D.	Vision improved much & patient went home apparently looking all right. Came back after 2 months with tubercular meningitis & died.
6.	N...	12	M	Headache; vomiting & staggering gait since three months.	Cranial nerves normal. No motor or sensory deficit. Horizontal nystagmus; Bilateral in-co-ordination and Positive Romberg's. Papillœdema. 3·4D both eyes.	Hb. 13·5 gms.%. W. B. C. 18,000/c.mm. P. 74%. E. 1%. L. 22%. M. 3%. E.S.R. 1st hour: 40 mm. 2nd. hour: 80 mm. C.S.F. Protein: 75 mgms.%. Sugar 62 mgms.%. Cells 2/cmm.	X-ray chest shows nothing abnormal. X-ray skull shows evidence of increased intracranial tension. Ventriculogram showed bilateral symmeterical dilatation of the lateral and 3rd ventricles.	Sub-occipital craniectomy with complete removal of tumour.	Patient was talking and taking feeds. Suddenly died.
7.	M...	6	M_o	Loss of Vision: 15 days Fits since 15 days, following a period of fever with headache and vomiting, which lasted for one month.	Slight ataxia. Only light perception in both eyes. Nystagmus present. Exaggerated jerks on both lower limbs with plantar. *Fundus*: Papillœdema of both eyes.	Hb. 7·5 gms.% WBC: 13,200/cmm. N. 76%. L. 24%. E.S.R. 1st 40 mm. 2nd hour: 103 mm.	X-ray chest showed an area of infiltration in right upper lobe. X-ray skull showed evidence of increased intracranial tension. Ventriculogram: showed evidence of space-occupying lesion in left parieto-occipital region.	Left parieto-occipital craniotomy with removal of one tumour and decompression.	Patient died Autopsy showed multiple tuberculomas.
8.	S...	12	M	Headache and vomiting since 6 months. Gradual loss of vision since 6 months and complete loss since 1½ months. No cough.	Complete blindness of both eyes. *Fundus*: Papillœdema with optic atrophy in both eyes. Nystagmus present. Left-sided facial paresis. Left epididymis enlarged. Fluid present in the abdomen.	Hb. 12 gms.% R.B.C. 4·53 mill W.B.C. 8,700/cmm. P. 52%. E. 13%. L. 35%. E.S.R. 1st hour 66 mm. 2nd hr. 98 mm. Mantoux 1 in 10,000 positive.	X-ray chest showed infiltration on the left side. X-ray skull showed evidence of increased intracranial tension. Ventriculogram showed bilateral symmeterical dilatation of the lateral and 3rd ventricles. 4th ventricle not visualized.	Suboccipital craniectomy with complete removal of tumour.	Patient was talking and taking feeds. Suddenly died. Autopsy showed tubercular lesion in lungs, spleen, kidneys and intestines.

from the physical findings and ventriculographic evidences. The space-occupying lesion was obvious in all cases after the ventriculogram.

Opinion is divided regarding the treatment. Those who oppose surgical procedure point out that these lesions are often multiple and may be in inaccessible parts. Even if they can be removed easily, a patient will have still tuberculosis in other organs which may lead to his death or give rise to further lesions in the brain. Moreover, removal may precipitate meningitis, and so they advocate treatment of tuberculosis as a disease with a view to promote healing, which may occur in a few cases.

While those who favour surgery put forward that according to the various statistics, two-thirds of cases are single and that operation may successfully be undertaken even in cases with active pulmonary tuberculosis. What at first appears to be tuberculoma may prove to be a benign type of neoplasm. Even though the patient may eventually die of tuberculosis a period of relief will be welcome to the patient.

With the use of streptomycin and P.A.S. our results are very encouraging and hopeful. The good results we have had, prompts us to present these cases.

According to the localization appropriate craniotomy was done, under local or intratracheal anæsthesia depending on the condition of the patient. As soon as the tumour was exposed a biopsy was made and sent for quick-frozen section. Complete removal of the tuberculoma was done very carefully. They usually appeared as hard, granular, discrete, avascular, and greyish in colour. Because of the firmness, removal by suction was not possible. The presence of caseous matter in the tumour was not infrequent, but frank abscess was not noted in these cases. The cavity was well cleaned by suction and physiological Ringer's solution and all bleeding points were stopped. After receiving the frozen section report from the pathologist as tuberculoma, one gram of streptomycin powder was instilled into the cavity. A piece of Gelfoam—one inch square—was also placed into the cavity. The streptomycin was absorbed by the Gelfoam and local concentration of streptomycin was kept high for several days. The dura was closed tight; bone flap was replaced and wired in place and the wound closed in layers as in all craniotomies. Occasionally, a pentrose drain was left in for twenty-four hours depending on the site of craniotomy. From the day of operation these patients were given half a gram of streptomycin twice a day for 40 days if the patients could afford to buy the medicine. A minimum of 15 grams were given to all. P.A.S. was also given. Daily lumbar punctures were done to these patients till their spinal pressure came within the normal levels, which usually did in three to four days. The temperature settled down to normal within a week. The wounds healed by primary intention. The general condition of the patients improved considerably, and so also, their appetite. The E.S.R., which to start with was high, gradually came down.

These cases were discharged from the hospital after their course of streptomycin.

Of the eight cases thus treated four cases (1 to 4) did well as mentioned above, but two (6 and 8) died suddenly after operation; their autopsy did not reveal anything abnormal and the cause of death might have been due to suppression of vital centres.

Case No. 5 was re-admitted for tubercular meningitis and died even after streptomycin treatment.

Case No. 7 did not show any improvement after the operation. He progressively became worse and died though he did not show signs and symptoms of meningitis.

Autopsies were done on all the cases that died and the pathological findings were extremely interesting.

Sections were taken from various parts of the tuberculoma. They presented two types of picture.

The first type showed very little caseation. Large number of giant cells and chronic inflammatory cells were present.

The second type showed very poor cellular response. It consisted of large areas of caseation. Very few giant cells were seen scattered around the periphery with the typical tubercle formation.

It was observed that the cases which belong to type 1 showed better prognosis than the type 2 cases. Case No. 5 presented a picture similar to that of type 2 and contrary to the observation, she went home in good condition. It did not surprise us much when she came back after two months with signs of meningitis.

Four cases (Cases 1 to 4) in this series of eight have done well so far. We have to admit that the follow-up period is only from 1 to 18 months. It may be possible that they may get infection of meninges or brain again, but their original conditions have been cured. The outlook for these patients had been hopeless without the radical procedure, therefore, it is felt very strongly, that all these tuberculomas of the brain should get the chance of a probable cure by this method of treatment.

The number of cases studied are not too many to form any opinion regarding this observation, but still it is worth considering.

SUMMARY

Summary of case histories of eight (8) tuberculomas of the brain is presented in tabular form.

Radical operative procedure with the application of local and systemic streptomycin is described.

Two pathological types of tuberculomas of the brain with their prognostic value are mentioned.

The encouraging results in the treatment of tuberculomas are given.

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THE AMOEBIC APPENDIX AND ITS PERFORATION

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Amœbiasis is recognised as a common protozoal disease in the tropics. But amœbic lesion of the appendix is rare and perforation of the organ due to amœbic involvement has been rarer still. The following case in which a diagnosis of perforation of the amœbic appendix was made at autopsy is reported because of its rarity.

Case Report

D. C., a refugee girl of 8 years was admitted in the Nilratan Sarkar Medical College Hospital on 8-8-50 with a history of œdema of the feet and of the face for one month and of loose motions for a fortnight. She had suffered from several bouts of dysenteric symptoms since an attack of measles about a month back. She had marked anæmia and ascites. Her stool showed vegetative forms of *Entamœba histolytica* on 31-8-50. The temperature remained normal throughout except that on 27-8-50 it went upto 100° F. She expired on 1-9-50.

Autopsy findings.—The body was pale and emaciated with evidence of pitting œdema around the ankles and with a bulging abdomen. A roundworm was seen protruding through the left nostril. The face did not look puffy nor was there any enlargement of superficial glands or engorgement of superficial veins. No cyanosis or clubbing of the fingers was present. Each pleural cavity contained about eight ounces of clear fluid with a slight pinkish tinge. The pericardial cavity contained about two ounces of serous fluid. The peritoneal cavity contained about four pints of fluid mostly thin though opalescent. As the depth of the cavity was approached the fluid became more and more opaque until in the right iliac fossa and in the right paracolic gutter it seemed to assume a fibrinopurulent appearance. The appendix was found bathing in this fluid but not bound up and near its tip there was a small circular perforation (Fig. 1). The opening had an external diameter of two millimeters and was surrounded by yellowish necrotic material. On slitting the organ open, two more minute ulcers were seen near the base. Several ulcers of different sizes were present in the cæcum and in the ascending and transverse colons. The mesenteric glands were enlarged and congested. The liver looked fatty but no abscess could be found out in the organ. The stomach, small intestine, spleen, kidneys, gall bladder pancreas, suprarenals, heart and brain were examined but no gross abnormality was detected. No other roundworm was found in the gut or in the peritoneal cavity. No amœba could be detected microscopically in the peritoneal exudate

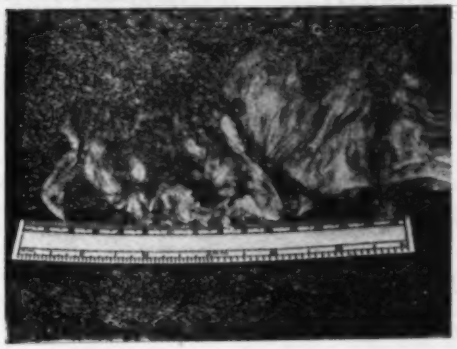

Fig. 1—Small perforation near the tip of the appendix.

which contained a lot of pus cells and fibrin. On section vegetative forms of *Ent. histolytica* could be seen in groups

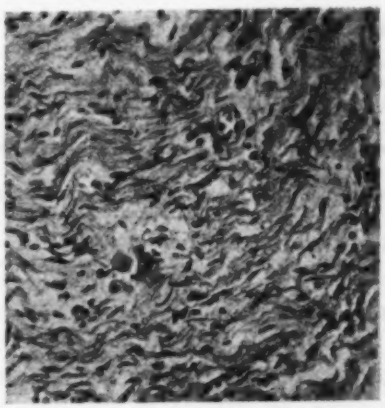

Fig. 2—Amœbæ in a rarefied area within the muscles of the appendix deep to the site of perforation.—H. & E. × 336.

and singly within small rarefied foci among the muscle fibres (Fig. 2) deep to the necrotic edge of the perforation.

Discussion

Table 1 summarises the reports of amœbic invasion of the appendix with and without perforation from different parts of the world. Of these Clark's report (1925) seems to be very interesting. Over forty per cent of his cases of amœbiasis which came to autopsy showed involvement of the appendix. The reports of

TABLE I—PREVIOUS REPORTS OF APPENDICULAR AMOEBIASIS AND PERFORATION

Author	*Total number and nature of cases*	*Number of cases showing involvement of appendix*	*Nature of appendicular involvement*	*Perforation in other places of large gut*	*Country or city*
Musgrave (1910) ...	... 50 cases of intestinal amœbiasis (autopsy).	3	Appendicitis	5 cases	Philipines.
Hogan (1920) ...	... 1 case (autopsy)	1	Appendicular ulcer, amœba in tissues	1 case	U.S.A.
Clark (1923) ...	... 186 cases of amœbic ulcers, (autopsy)	76 (40·8%)	*Perforation*—7 Ulceration—69	19 cases	—
Strong (1925) ...	... 100 cases of fatal amœbic ulcerations, (autopsy)	7		19 cases	—
James (1926) ...	... Autopsy on fatal cases of amœbiasis	33·3%	Ulceration	—	Panama.
Greaves (1933) ...	... 1 case (autopsy)	1	*Perforation*	—	U.S.A.
Craig (1934) ...	... Autopsy on 60 cases of fatal amœbiasis	16 (26·6%)	Appendicitis	Nil	—
Mosto (1934) ...	... Autopsy on 3 cases of perforation of the gut	1	*Perforation*	2 cases	Argentina.
Banerjee *et al.* (1926)	... 475 operations of appendicectomies	25 (5%)	Cysts in the lumen	—	Calcutta.
Fairley and Low (1941)	... Of all amœbic cases	7%	Appendicitis	—	—
Oschner and De Bakery (1942) ...	... Of all appendices removed for appendicitis	10%	Amœbiasis of the appendix	—	U.S.A.
Hawe (1945) ...	... 430 cases of amœbiasis	1	Ulceration and amœba in lumen	1	Madras.
Payne (1945) ...	... 1,000 cases of clinical amœbiasis	Nil	—	8	India.
Hamazah (1946) ...	... 50 appendices removed for chronic appendicitis	13 (26%)	Amœba in tissues	—	Palestine.
Tallant and Maisel (1946)	... 273 cases of appendicectomies	9	Amœba in tissue—1 Amœba in scrapings—6 Amœbic appendicitis—2	—	Middle East.
Bonne (1947) ...	... Operation on a case of appendicitis	1	Ulceration and amœba in scrapings	—	Indonesia.
Reddy and Thangavelu (1948) ...	... 44 autopsies on cases of amœbiasis	2	Ulceration	36 cases	Madras.

James (1926) and of Craig (1934) also showed high frequency of appendicular involvement in amœbiasis. Hamazah (1946) from Palestine raises a question which shcuild be seriously considered. He reports that in about twenty-six per cent of his cases of appendicitis amœbæ could be demonstrated in the wall of the appendix. Appendicitis is not a rare disease in India nor is amœbiasis. The search for amœba in the lumen of the appendices resected for chronic appendicitis by Banerjee and his coworkers (1936) has revealed the presence of cysts of *Ent. histolytica* in about five per cent of the cases. Thus, if the amœbæ could have reached the lumen of this crgan there is no reason why they should not invade the wall of this part of the large gut and set up appendicitis. This possibility should be kept in mind in the treatment of cases of appendicitis, firstly because if it is of amœbic etiology it should respond to specific therapy and secondly because there is chance of the sutures on the wall of a possibly diseased cæcum slipping away during operation (James, 1946). However, the morbid anatomist may be able to throw further light on this question by careful search for amœbæ in the wall of the resected appendix in appendicitis.

As will appear from the table reports of amœbic perforation of the appendix has been rare,—we could gather only four such reports covering nine cases. The present case appears to be a fresh addition. There was evidence of infestation with roundworm in our case. However the worm could not possibly have taken part in the development of the perforation either before or after death as no worm could be seen in the intestines or in the peritoneal cavity which contained a lot of fibrinopurulent exudate around the appendix.

Conclusions and Summary

A case of perforation of an amœbic ulcer of the appendix in a girl of eight years is described. Incidence of amœbiasis with appendicular involvement and perforation in different countries has been discussed. The risk of appendicectomy in amœbic appendicitis is pointed out and a case is made for careful search for amœbæ in the routine histological examination of the wall of the chronic appendix.

Acknowledgment

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PRACTITIONERS' CORNER

CHEMOTHERAPY, OPHTHALMOLOGY AND THE GENERAL PRACTITIONER*

NAUMANN T. MASCATI, D.O.M.S.,

Surat

The general practitioner in his clinic daily comes across cases which can be grouped as follows:

1. Lesions of skin and deeper structures of the eyelids and surrounding area near the orbital rim. Included in this are lid swellings from various causes, sinuses of and near the orbital rim, sinuses of the lacrymal sac, inflammation of the lid margins, hordeola commonly known as styes, acute and chronic dacryocystitis.

2. Lesions of the palpebral and bulbar conjunctivæ: These include acute and chronic conjunctivitis, purulent and non-purulent—most commonly due to secondary pyogenic infection, trachoma and phlyctens.

3. Lesions of the cornea: Keratitis, suppurating and otherwise with or without hypopyon. Keratomalacia.

4. Perforating injuries and other traumatic cases.

5. Panophthalmitis and enophthalmitis.

All these above mentioned diseases barring a few can be very easily treated by the general practitioner, if the sulpha group of drugs or the indicated antibiotics are used in the right form and correct dosage, keeping in mind the saturation needed in the blood and the aqueous. Time and again one sees a case which has been perfunctorily treated with either sulphonamides or penicillin with the result that the efforts of the physician have led the patient nowhere, or rather to a point where the organisms have become resistant to the drugs half-heartedly given. The valuable time thus lost, during which the disease has become chronic and resistant, could have been utilised with benefit in eradicating the disease if only the basis of administration and mode of use in ophthalmology of these drugs were kept in mind before employment of the chemotherapeutic agents.

Sulpha Group of Drugs

It would be worth while before we advance to the treatment portion, to consider the elementary pharmacology of the sulpha group of drugs and the antibiotics. The most commonly used of the sulphonamides are; Sulphapyridine, sulphathiazole, sulphamezathine, and, sulphadiazine, while sulphanilamide, a glowing tribute to the zeal of Domagk, after its above mentioned progeny, is retiring fast into oblivion. It will not be out of place if I mentioned the mode of action of the

* Paper read before the 5th Gujarat and Saurashtra Provincial Medical Conference, Nadiad, March, 1951.

sulphonamides. Folic acid or pteroylglutamic acid is necessary for the existence of certain bacteria, and it is developed by the combination of para-aminobenzoic acid with glutamic acid. The sulphonamides destroy the PABA, thus depriving the bacteria of the necessary folic acid.

Sulphanilamide, sulphapyridine, sulphadiazine, and sulphamezathine get into the blood and aqueous very well, not so sulphathiazole. Suffice it to say, that the bacteriostatic qualities of the drugs intraocularly after their administration are highly potent. The concentration of the sulphonamides in extra-ocular tissues is quite marked with any preparation, while the intraocular level varies with different preparations. It is of interest to note that the concentration reached within the eye are considerably higher with sulphanilamide and sulphapyridine, than with sulphadiazine, whilst those of sulphathiazole are distinctly poor. Sulphamezathine, on the other hand, gives very high level and penetrates into the eye very readily. Sodium sulphacetamide is more potent than any other sulpha preparation when applied locally. It is highly soluble in water and consequently is more easily absorbed by local instillations, in the conjunctival sac. The sulphonamides besides being specific against coccal infections are also potent against certain viruses like those of trachoma, inclusion blennorrhœa etc.; *B. pyocyaneus* is also reported to be affected by them.

The treatment is carried out by the internal administration and by topical use. The usual dosage is 2 tablets (0·5 gm. each) of a least toxic preparation, three times a day for six days. This is adult dosage. This ensures a very adequate concentration in the blood and aqueous. I employ sulphamezathine orally because of its low toxicity and slow excretion which allows one to prescribe it every six hours.

Locally the application is carried out in three ways: (1) By drops of an aqueous solution. (2) By introduction of ointments in the conjunctival sac. (3) By dusting of very finely powdered drug. As regards the drops, the following are commonly used: (1) Sodium sulphacetamide 10 per cent aqueous solution. (2) Sulphanilamide 0·7 per cent solution. (3) Sulphathiazole 5 per cent solution. These drops are instilled every two hours in the conjunctival sac side by side with the oral treatment. The ointments are numerous and almost all are efficacious, specially those which are prepared with a base which is very easily miscible with the lacrymal secretion. As far as the drug is concerned the best results are obtained with a 10 per cent ointment of sulphacetamide and a 15 per cent concentration of Irgafen, a compound of two sulphonamides, dimethylbenzoyl-sulphanilamide, and dimethyl-acrol-sulphanilamide. These ointments are applied in the conjunctival sac every two hours in acute conditions and four hourly in subacute. Moreover, an application at night is highly suitable when instillations by drops are not practicable.

The dusting of a very minutely pulverized powder many a times brings almost dramatic results when the condition does not respond to any other therapy. I employ sulphadiazine combined with acriflavin as dusting powder, and this has given me real satisfaction in many acute purulent conjunctivitis cases. One must be careful, however, to remove any excess of powder from the fornices which gets mixed up with the mucus as otherwise the corneal epithelium is liable to be abraded, apart from the sense of irritation which the patient is bound to experience.

Antibiotics

Of the antibiotics, penicillin is mentioned first. Then comes streptomycin followed by aureomycin, chloromycetin, terramycin and tyrothricin. These are the only antibiotics which have been tried in ophthalmology so far, and studies made of their action and toxic effects. They act by hindering the bacterial cell division or by interfering with essential processes. More possibly they interrupt the metabolic enzymes of the bacteria. For matter of convenience we will only consider penicillin in the pure crystalline form. Penicillin differs from the sulpha drugs in that large amounts of it do not help in increasing the antibacterial power; It is the maintenance of the blood level which is of such paramount importance in the general systemic administration, while in the eye the presence of penicillin in adequate amounts in the aqueous and the vitreous makes or mars the organ. Penicillin is four times as potent as sulphathiazole, and twenty times as potent as sulphapyridin, and one hundred times as potent as sulphanilamide. It is non-toxic and the bactericidal action is not inhibited by bacterial secretion. Moreover, the topical application has no adverse effect on the corneal epithelium, and the quality which makes it the drug of choice in ophthalmology is its compatibility with other drugs like atropine, cocaine etc. The saturation of penicillin in the tissues is in the following order: Extra-ocular muscles, conjunctiva, sclera, chorioretina, aqueous very little and lastly only a trace in the vitreous; none in the lens. With abraded cornea or ulcer of the cornea penicillin is absorbed very rapidly.

The dosage of penicillin for therapeutic effects on the eye was an undecided point till recently when after detailed study of various ocular tissues it was found that for a maximum concentration in the ocular tissues, it must be given in high dosage, 500,000 units by vein initially, followed by a maintenance dose of 250,000 units every eight hours intravenously to ensure a high concentration in the aqueous, which occurs after five minutes of initial intravenous injection. The intramuscular routes to my mind are not at all suitable, since the drug appears in the aqueous, 50 minutes after administration. Topical applications are very well tolerated and the stuff is able to penetrate the blood aqueous barrier in the inflamed eyes. By drops the usual titre which is commonly employed is 2,500 units

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per c.c. every 15 minutes which is really very troublesome not only to the patient but also to the physician. In fact, the correct procedure is to instill penicillin in the specified dilution every minute into the affected eye. The alternate method which has been found very satisfactory and in some instances even superior, is by anæsthetising the conjunctival sac and by inserting a cotton pack in the upper and outer part of the superior fornix. The pack is moistened with penicillin solution of 5,000 to 20,000 units per c.c.; This ensures an immediate penetration in the aqueous and a reservoir of the drug in the conjunctival sac.

Penicillin in ointment form is also very useful, and in oily base it diffuses into the intact cornea better because of the fat water barrier. There are yet more quick ways of having penicillin intraocularly. These are, iontophoresis, subconjunctival and intravitreal injections, which I think are not practicable for the general practitioner.

Of the other antibiotics *streptomycin* is mainly employed against gram negative and acid alcohol fast organisms. The killing rate increases by higher concentrations as opposed to penicillin. Presence of glucose, ascorbic acid and anaerobic conditions deter its actions. The local use is preferable to systemic because the toxic reactions are less, though the dangers of local therapy are local tissue reactions and local allergic reactions, and the regeneration of the corneal epithelium is retarded. Moreover, the organisms become rapidly resistant to the drug. By drops it is used in a stronger strength: 1 gm. dissolved in 2 c.c. of distilled water every hour for twelve hours, (Dasgupta, 1950); according to Leopold 10,000 to 20,000 micrograms per c.c. every half hour for the first 3 hours, then every hour for the first day and every two hours next day. The ointment form is used as 10,000 micrograms per unit of base, at night. Cotton packs soaked in solution of 20,000 micrograms c.c. at eight hour interval are also useful and potent. Again subconjunctival, vitreal injections and iontophoresis are beyond the scope of the general practitioners and so need not be discussed here. However, I may mention that a combined use of promozole, or para-aminosalicylic acid or TB 1 greatly enhances the therapeutic properties of the drug and synergistic effect is par excellance. The susceptible organisms which are affected by it better than by penicillin are: *B. pyocyaneus and hay bacillus.*

Aureomycin derived from the mould of streptomycis aureofaciens, is another powerful agent which is of great benefit in the virus of trachoma, herpes simplex, brucellosis, diphtheria, lymphogranuloma. In fact, aureomycin has high antibacterial action against most ocular pathogens. It is used orally in doses of 250—500 mgms. twice a day for 6 days, and locally in 0·5 per cent borate solution every ½ hour day and night. The ointment form is also available and is easier to use.

Chloromycetin is yet another mighty antibiotic in the armamentarium of the modern medical man (or woman). For intra-ocular saturation, experimentally, 6 gms. by mouth in 5 minutes give a very adequate presence of the drug in the intra-ocular tissues. Generally 3 capsules stat and thereafter 0·5 gms. or 2 capsules every two hours was found sufficient to produce the desired effect. Locally, 2·5 gms. in 50 c.c. of water as drops, or 50 gms. in 1 gm. lanolin locally, Chloromycetin was found highly bactericidal, and an instance of an eye being saved from already set in endophthalmitis was reported by Leopold (1950) when all the other antibiotics had failed.

Terramycin derived from the mould of streptomycis Rimosus is still in the experimental stage for the ocular therapy, so is tyrothricin derived from B. brevis of Dubos. Bacitricin is a powerful antibiotic and can be used in high concentration externally and is valuable in infections of the vitreous (Bellows and Farmer, 1948).

Having given you all this in some details I would like to point out some of the diseases which a general practitioner in his daily busy practice can very easily cure if he keeps in mind the facts I have already mentioned, *viz.*, the agent should be chosen according to the nature of the disease and it should be used in the right dosage and right proportion. Apart from primary infection with the virus diseases like trachoma and herpes, the keynote of our choice for treatment with the chemotherapeutic agents should be secondary infections.

We, therefore, begin with the infection of the lids where a crop of *recurrent hordeola* commonly known as styes gives the patient as well as the family physician headache since these are inordinately resistant to treatment. One must first acertain the cause; if any infection is at the bottom, then it can be taken care of, but if it is a case of fresh infection every time, then the cause is elsewhere, and one must find out from where the new infection occurs every time. It is not surprising how many cases with very small and seemingly insignificant errors of refraction are victims of this trouble. The explanation is very simple. With a very minor error, one is always ambitious to see everything in perfect details which he is not qualified to do, and the continuous strain on the ciliary muscles which help him to achieve his ambition finally fags out with the result that he gets eye strain with epiphora which in the end forces him to wipe his eyes with his unclean fingers carrying the loaded infection to the lid margins where the glands pick it up. No amount of penicillin, sulpha can do even a bit of good unless the cause is treated.

For the common infected styes, in addition to the usual hygiene, a course of sulphamezathine orally combined with a local application of penicillin ointment four times a day would solve the problem. *Acute*

dacryocystitis: This is a disease of the human body, which, contrary to the usual traditions, becomes chronic first and then acute; The cause is usually a stenosis or complete blockage of the canaliculi or the naso-lacrymal duct. The stagnant lacrymal secretion and mucus imprisoned in the sac stagnates and gets secondarily infected, and it is only this latter which can be cured by the sulphas or the antibiotics. One, therefore, has to cure the acute condition first and then revert it back to the chronic state which requires surgical interference. It is the duty of the physicians to prevent the sinus of lacrymal sac by treating the phlegmon rigorously with a six day course of sulphamezathine and/or penicillin injections 250,000 units twice daily for four days, because the chief infecting organism is invariably the pneumococcus. Local hot fomentations help a lot. Lid abscesses do very nicely with the same treatment and prevent ugly mutilating scars. Osteomyelitis of the bony rim or the orbital walls if not too deep seated can be successfully treated if the cause can be elicited and, of course, if there is no sequestrum. Orbital cellulitis either due to infection of the paranasal sinuses or due to infection of the cavernous sinus, must be treated promptly and it would be happier for all concerned if the responsibility is thrown on the shoulders of a specialist. Similarly, panophthalmitis and endophthalmitis, unless the general practitioner believes himself capable of coping with the situation, should be the specialist's job.

Most important of all are the instances when *extra-ocular or an intraocular foreign body* is presented either fresh or after some days. In the former instance prophylactic treatment should be instituted and the case referred to an ophthalmic surgeon as early as possible if the foreign body is intraocular and the injury perforating. In cases of extraocular foreign bodies if in the conjunctival sac, or lightly embedded in the cornea, the eye can be anæsthetised and the material removed with a needle and spud from the cornea, or with a cotton swab from the upper fornix or the sulcus subtarsalis which is the usual place where the thing lodges. In all cases where cornea is denuded of its epithelium, antibiotics must be used either in the form of packs or ointments and the eye bandaged. This will prevent many ugly sequelæ. The days of argyrol and guttæ zinc are fast disappearing and the practitioner must suit himself to the trend of treating the various forms of conjunctivitis with the aid of new drugs.

Purulent conjunctivitis need first of all strict hygiene and care of the inevitable catarrhal nasal condition from where the vicious cycle begins. Flushing out the conjunctival sac with sterile water or boric lotion, or even ordinary tap water would constitute the first and very important step in the treatment, for irrigation with any antiseptic lotion is as good as doing it with clean water since the aim is to clean the sac of as many organisms as possible. There is no antiseptic potent enough to destroy the organisms, during flushing without damaging the conjunctiva or the cornea, at the same time. The main idea is to cleanse the eye of debris and mucus and pus. Dusting a little thiazol and proflavin powder or putting in sulphacetamide drops, and dispensing the same with penicillin ointment for the night combined with a course of sulphamezathine would definitely take care of the condition. Mild subacute conjunctivitis is amenable to local application of Irgafen eye ointment four or six times a day.

Trachoma demands our attention next. Thanks to the sulpha group of drugs, the dreaded curse of the east will soon disappear, for the sulpha group has specific action on the virus. From the recent works of Thygeson (1943), Leopold (1950), and Siniscal (1950) it is amply proved that in the majority of cases it is not the secondary infection which is taken care of by the sulpha but actually the follicles disappear. But to label a cure as permanent at present is a gross untruth; We yet have to uproot the cause of the pathological changes, till then empirical use of sulphonamides and other antibiotics would remain problematic in the disease. However, once trachoma is diagnosed, stringent precautions to prevent its contagion is incumbent upon the physician as in a case of typhoid or diphtheria or cholera. The actual treatment consists of a course for a week with sulphamezathine 2 tablets three times daily in the adults (1 gm.) and local use of sulphacetamide 10 per cent drops every two hours and application of 10 per cent sulphacetamide ointment at night. Many a times it is spectacular to watch the results of such a simple and comfortable therapy, a distinct step forward from the age old application of silver nitrate and copper sulphate from six months to several years. This is within easy reach of the general practitioner, and it is our request to him to be of help to us to uproot this main cause of blindness. Recently, very favourable reports have been available for aureomycin in the treatment of trachoma, but further trials are yet needed for its final evaluation.

There is another condition where also the judicious use of streptomycin in combination with other adjuvants can give the physician a complete control over the condition and perhaps over the diathesis of the patient leading to more dangerous conditions later on. This is *phlyctenular conjunctivitis* and *keratitis*, which mere dusting of calomel can never eradicate. It is an indication of a tubercular process elsewhere in the body. True, phlycten fails to demonstrate any tubercle bacillus but nevertheless the granulomatous pathology is just the same, and the therapeutic test positive. Building up of general health and tuberculin should be started primarily. It is only when the condition is unyielding that a consideration for streptomycin should be entertained, for it would be almost criminal to make the bacillus resistant to the drug.

And finally a few words about the treatment of *corneal ulcers* which if not far advanced can be treated

by the general practitioner by the use of sulpha and the antibiotics. If a hypopyon is present, and the ulcer progressing the condition is beyond the jurisdiction of the practitioner and it better be treated by a specialist. Other small infected ulcers would respond very well with penicillin injections and penicillin ointment in the eye which should or rather must be bandaged.

I trust I have infused some interest in you for ophthalmology. I meekly acknowledge my brazenness in daring to revise some of your learning and bring to the surface the familiarity gained by actual experience by you all, but I feel that the poor eye is neglected by the average general practitioner as if it is less important than an appendix or even an aching tooth. Let me end by humbly quoting one of the master principles of Hippocrates: The principle that the physician can not impose healing on his patient but rather must seek to study, utilize and assist the innate healing, defensive, adaptive and control forces of organism, the "Vis Medicatrix Naturae." or φvσις for a therapy of the disease.

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THE PRESENT STATUS OF MANAGEMENT OF ABDOMINAL TUBERCULOSIS

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Since the discovery of Streptomycin, P.A.S. etc., an all-round progress has been made with regard to a satisfactory treatment of abdominal tuberculosis. These drugs in combination with other treatments specially surgery help to arrest the disease in the majority of cases.

TREATMENT

Treatment is considered under the following heads:

A. GENERAL: Rest in bed as required of all tuberculous patients is also strongly recommended for patients with abdominal tuberculosis. The rest should be both physical and mental. The diet for such patients should be nutritious and of low residue. Vitamin supplements such as codliver oil and tomato juice are of great value. Diluted milk, fruit juice, toasted bread, boiled eggs, ovaltine, liver soup etc., should be given in large quantities in addition to patients' normal diet. Heliotherapy, which once had great reputation for relieving this condition is rarely being used now-a-days. Deep x-ray therapy, pneumoperitoneum, and similar other treatments have also become of historical importance only. At present surgery supplemented with various chemotherapeutic drugs gives excellent results. Therefore, it is felt that a detailed discussion on this subject will be helpful.

(B) CHEMOTHERAPY: (a) *Streptomycin*—The clinical results of streptomycin therapy in abdominal tuberculosis has been found exceptionally good. Thus the streptomycin committee of the Veterans Administration of U.S.A. quoted by Hoon *et al.* (1950), observed symptomatic cure in 32 cases with intramuscular injection of 2·0 or 1·0 gm. of streptomycin administered daily for 60 to 120 days. Within a few days the symptomatic relief occurred as was also the case in most of our patients. If there is favourable response to this therapy, it usually occurred within about 15 days of the treatment. In the opinion of the streptomycin committee the results are uniformly and remarkably favourable and that tuberculous lesion of the alimentary tract constitutes one of the primary indications for streptomycin therapy.

The more acute the disease the better the results from chemotherapy. Acute miliary tuberculosis producing tuberculous peritonitis responds very well to the streptomycin therapy. However, it has been reported in *J.A.M.A.*, (142: 650, 1950) recently that such a favourable result in the early stage of the disease does not last long and in many cases recurrence was found in some part of the body especially in the meninges producing fatal results.

In acute tuberculous peritonitis not accompanied with other tuberculous lesion, the results of streptomycin therapy along with laparotomy and with P.A.S. have been found very efficacious. Thus, in our 6 cases with acute diffuse tubercular peritonitis, 4 had streptomycin and laparotomy, and two had streptomycin, P.A.S. and laparotomy, and to our utmost surprise all the six have been found relieved completely. Grant *et al.* (1951) also reported two cases of acute tuberculous peritonitis treated with streptomycin, P.A.S. and laparotomy with excellent results. Which one of those mentioned above is mainly responsible for such remarkable relief, is difficult to assess especially in view of the fact that even before invention of chemotherapeutic drugs, the exploratory laparotomy has been found responsible for arresting the diseases in some of these patients permanently. However, it is thought that chemotherapeutic drugs especially streptomycin had a substantial influence in giving such a rapid and lasting relief. In all other varieties of abdominal tuberculosis, namely tabes mesenterica, ulcerative or hyperplastic type of intestinel tuberculosis, results of streptomycin therapy alone are not unifor-

mly good. In twenty-seven cases of this series, result was not very good, although in most of the other patients substantial clinical improvement did occur, within a short period of treatment.

(b) *P.A.S. (para-amino-salicylic acid)*—The Medical Research Council of United Kingdom have recently (1950) studied the comparative effects of streptomycin and P.A.S. on patients with various types of pulmonary tuberculosis and reached the conclusion that streptomycin combined with P.A.S. is very effective in not only producing regression of the disease but also in diminishing the number of resistant forms of tubercle bacilli. Both of these drugs given together were more effective than either of them administered alone. Further, of these two drugs streptomycin alone was found somewhat more useful than P.A.S. alone. Because of the above report, we have not used P.A.S. alone on any patient with abdominal tuberculosis. Whenever we resorted to chemotherapy we used either streptomycin alone or more recently streptomycin combined with P.A.S. However Kallquist (1950) reported favourable results in twenty-two patients with secondary intestinal tuberculosis complicating pulmonary tuberculosis treated with P.A.S. alone. In his series he found complete radiological regression of the disease in 10 cases and almost complete in one. There was considerable regression of the disease in 7. In 4 no radiological follow-up could be made and 3 were dead.

(C) SURGICAL TREATMENT: The results of the surgical treatment in 22 patients in this series have been so gratifying that we have now almost decided to carry on the surgical procedure on every patient with abdominal tuberculosis. Various surgical procedures that have been carried out on these patients along with results obtained are given in a table. To compare results of surgery in our patients, we had a control series of 27 patients who either refused operation or we ourselves did not perform operations for reasons of poor general condition. However, we believe now that we should not hesitate to carry out various surgical procedures on these patients, if they could come to us now. In these so-called control series, 4 patients left the hospital against medical advice because they did not get any relief within a short period of treatment with chemotherapy alone. Four patients were discharged as unimproved because of failure of medical treatment. Two of them died later at their homes. Majority of the remaining 19 patients, have been discharged as improved and relieved from their trouble. It is doubtful, however, for how long such improvements will last; because their general condition and the main trouble did not improve as markedly as that of patients treated surgically. A few of them have already returned to our clinic for getting further treatment. On the other hand, out of 22 patients who underwent various operations only 2 returned with any complaints. One of the latter group came with a minor complaint of frequent gurgling sound in the abdomen who had an ileotransverse colostomy for hyperplastic tuberculosis. The other, who had tabes mesenterica,

TABLE SHOWING ANALYSIS OF THE RESULTS OF TREATMENT

No.	Treatment given	Intestinal tuberculosis					Tuberculous peritonitis					Tabes mesenterica					Grand Total
		Total	Relieved	Improved	Unimproved	Died	Total	Relieved	Improved	Unimproved	Died	Total	Relieved	Improved	Unimproved	Died	
1.	Chemotherapy alone (Streptomycin with or without P.A.S.) ...	11	3	6	2	—	6	1	3	2	—	10	2	4	4*	—	27
2.	Surgery with Chemotherapy																
	(a) Right Hemicolectomy	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	2
	(b) Ileotransverse colostomy	7	6	1	—	—	—	—	—	—	—	—	—	—	—	—	7
	(c) Jejunoileostomy ...	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1
	(d) Simple Laparotomy	—	—	—	—	—	8	6	2	—	—	—	—	—	—	—	8
	(e) Excision of Mesentric lymph glands	—	—	—	—	—	—	—	—	—	—	4	3	1	—	—	4
																	49 + 1 (Post Mortem Case).
																	50

* 2 patients of this group died later on at their residence.

complained of slight diarrhœa probably not connected with the original disease. He is still under investigation.

Although the present series of patients is a small one, and the follow-up study of these patients is not sufficient enough to draw up any definite conclusion, the author still believes very strongly that all patients with various types of abdominal tuberculosis should be submitted to the surgical treatment. This should be carried out during the course of medical treatment discussed above. These excellent results obtained from surgery are not because of improvement in various surgical technics alone but also due to inventions of various chemotherapeutic drugs like sulphasuxidine, penicillin, streptomycin, P.A.S. etc., which have completely changed the outlook of these patients.

(a) *Tuberculous Peritonitis*—This condition was amenable to surgery even before the era of chemotherapeutic drugs. The first operation for this condition was performed by mistake by Spencer Wells in 1863 and to his surprise the patient was well after 22 years. Thereafter, the surgical treatment was adopted deliberately by many surgeons with fairly good results. Since the combination with chemotherapy the results obtained by surgery are more gratifying and outlook of such patients have become very bright. As already discussed the operation should be performed in the middle of the course of chemotherapy.

The operation essentially consisted of opening of the abdomen, sucking and mopping up of all the exudative fluid from the peritoneal cavity and closing of the abdomen without putting any drainage tube. We always hesitated to excise any of the affected organs like fallopion tubes, appendix etc., at this stage, because of the danger of fistula formation. Following this the patient usually improves considerably in all respects and all the toxic symptoms, like high temperature etc., disappear. It is difficult to explain here as to how this operation produces such a favourable result. Some observers explain that removal of exudation and toxic fluid from the abdominal cavity reduces the extent of toxin absorption into the blood, which in turn facilitates the natural resistance of the body to fight the original seat of infection.

In our series, six patients were treated surgically in the above manner, during the course of streptomycin therapy with excellent results in all of them. Laparotomies were also performed on two more patients, one with localised tuberculous peritonitis and the other with nodular type of tuberculous peritonitis. Both these patients improved considerably after the operations. However, they did not get complete relief from their trouble at the time of discharge from the hospital. These two patients are still under our observation.

In patients with tuberculous peritonits of adhesive type surgery does not produce such a remarkable improvement and in these patients operation is usually required to relieve the intestinal obstruction.

(b) *Tabes Mesenterica*—Problem of surgery of tuberculous mesenteric lymphadenitis is no less than that of tuberculous lymphadenitis anywhere else in the body. Our present programme for such patients has been opening of the abdomen, removal of some or most of the enlarged mesenteric glands as also suggested by Evans (1950) and closing of the abdomen as usual. This procedure is always done along with a course of streptomycin therapy, more recently with P.A.S. in some cases. It is important to realise here that all the enlarged glands cannot be removed as is the case anywhere else in the body. Therefore, only the fairly big and diseased glands are excised avoiding any serious injury to the important blood vessels of the intestine. Results so far obtained by this type of treatment were gratifying in 4 of our patients, in comparison to 10 other patients who either had only general treatment or had a course of streptomycin therapy. By comparing the results of surgical and non-surgical treatment in patients of this group, I have no doubt that the former group went out of the hospital more satisfied with complete absence of symptoms. Similar results have also been obtained in most of the cases reported by Evans (*loc. cit.*).

(c) *Intestinal Tuberculosis*—(1) ULCERATIVE TYPE: In the ulcerative type of intestinal tuberculosis the results are mainly dependent upon the improvement in the original lung lesion. In our series, only three patients were submitted for operation who had obstructive lesion in the intestines. Two had ileotransverse colostomies and the other had jejuno-ileostomy. All these patients were relieved completely from their trouble by operation and their general condition improved considerably.

Since the introduction of chemotherapeutic drugs the outlook of these patients have become considerably improved and many such secondary ulcers do heal by the chemotherapy alone. However, they still need surgical treatment not for the ulcers, but for the stenosis produced by successful healing. In such patients lateral anastomosis between the loops of intestines is made to relieve the obstruction, some requiring even more than one such anastomosis to relieve multiple strictures. If the lesion is very localised and if the general condition permits, excision of the lesion is also tried.

Archibald in 1917, quoted by Brown and Sampson (1926), was the first surgeon to report a large series of patients with secondary ulcerative tuberculosis for various types of complications of the disease. Although his immediate results were very good with an operative mortality of 6·7 per cent in 74 of his patients, the ultimate results were not very much encouraging. The operations included simple appendicectomy, excision of the colon, lateral anastomosis etc. However, not a large number of surgical cases have been reported thereafter. Since such patients are usually seen in the sanatorium, our experience in the surgical management

of these patients is much limited. Even from the meagre experience the author strongly believes that the outlook of these patients following surgery should not be as gloomy as it used to be in 1917 especially in view of the considerable improvement in surgical management, and also due to the introduction of the chemotherapeutic drugs. Investigation in this problem can be undertaken in a large number of patients only at a sanatorium and it is hoped that some one from these institutions will take this problem up for a thorough enquiry.

(d) *Hyperplastic Tuberculosis*—The value of surgical treatment in the hyperplastic form of ileocæcal tuberculosis is recognised widely since many years. In this type since the disease is primary and is localised to the lower 6 inches of the ileum, cæcum, and appendix excision of the involved segment of the bowel (right hemicolectomy) followed by an end-to-side anastomosis between the ileum and transverse colon is the ideal treatment. This operation can be done either in one or two stages. With the discovery of many chemotherapeutic drugs producing intestinal antisepsis, such as sulphasuxidine etc., one stage operation is preferable if such procedure can remove the whole of the involved segment of the bowel. We found only 2 cases in our series whom we thought were ideal for such a treatment. Both the patients were young women with a fairly good health. They stood the operation well and got rid of this disease completely by this operation. On the other hand Aird (1949) is of the opinion that in these patients usually the symptoms are more often due to successful healing of the disease producing scarring and stricture etc., at the ileocæcal junction than to an actual tuberculous process. Therefore, he is of the opinion that it is usually sufficient to perform ileotransverse colostomy excluding and allowing to rest the ileocæcal region and ascending colon. It is his, and also the opinion of the author that many a time after this latter operation, the ileocæcal swelling decreases in size and even sometimes disappears; but it is also our observation that in some patients a disturbing gurgling noise appears for which the patient again seeks some advice. In such cases excision of the involved bowel in the second stage should be attempted. The author has resorted to ileotransverse colostomy only in five of his patients of this series whose lesions were either somewhat more diffused than the actual ileocæcal region or in those patients who had only a localised lesion, but with a poor general condition. In all these patients symptomatic relief, improvement in the general condition and regression in the size of the swelling were obtained immediately. In one patient, however, a gurgling sound in the abdomen appeared for which a second operation was advised. However, he had not so far submitted for this. In all these patients the surgical treatment was given in combination with the chemotherapeutic drugs.

Summary

(1) Since the introduction of chemotherapeutic drugs against tuberculosis, the outlook of these patients have become completely changed. Importance of surgery for relieving this condition is now realised greatly and with surgery and chemotherapy such as streptomycin and/or P.A.S. one can expect to cure this disease with a reasonable certainty.

(2) Simple laparotomy for tubercular peritonitis, excision of most of the diseased glands for tabes mesenterica and local excision or lateral anastomosis for intestinal tuberculosis are some of the surgical procedures that are commonly practised now-a-days. All these surgical procedures are carried out during the course of streptomycin therapy with or without P.A.S. By adopting all these measures the author obtained excellent results in most of his surgical cases.

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PATHOLOGIC CORRELATION BETWEEN INTESTINES AND KIDNEYS OF DOGS

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INTRODUCTION

Investigation of the diseases either of kidneys or those of intestines unearths the existence of interesting pathologic relations between these two organs; but till now not much intensive work has been undertaken towards the solution of this problem. While tackling with this problem one can easily guess that an intensive study of the diseases of kidneys and those of the stomach and intestines side by side, is yet to be taken up to reveal the pathologic correlation between them in its threadbare form. It has been observed frequently while autopsing animals, especially dogs which are more prone to renal and digestive disorders from time to time, that where there was the existence of some intestinal diseases of inflammatory nature there was the evidence of certain pathologic changes in the kidneys provided the affection of the former persisted for a certain period of time both in acute and in chronic forms.

Whenever the renal diseases are surveyed, it spontaneously reveals that certain diseased conditions of kidneys are more or less invariably accompanied with some sort of trouble either in the stomach or in the intestines, or in both. Most commonly both the stomach and intestines are affected simultaneously although the pathology of one organ may overshadow that of the other due to the difference in severity of the irritation when conveyed to the individual portion of the alimentary tract with varied sensitivity.

Attempts have been made to reveal more definitely the fact that there exists a relationship between the intestines and the kidneys so far as their pathologies are concerned; but there is much yet to investigate along this line during the days following.

REVIEW OF LITERATURE

In surveying the ætiological factors responsible, it transpires that the irritant poison of any type causing various inflammatory changes of intestines is also indirectly inciting kidney lesions provided such pathologic conditions of the intestines persist for a certain length of time. The sources of intestinal irritation (Boyd, 1947) are as follows:

(1) Indigestible and irritating food, *i.e.*, rich or unedible and fermented food (non-bacterial).

(2) Food poisoning, the so-called food poisoning is in reality the decomposed food with a mass of pathogenic bacteria.

(3) Chemical poison, such as, mercury, arsenic, phosphorus, lead etc.

Likewise, a number of renal diseases also act as the causative factors of some intestinal affections, *e.g.*, any kidney affection responsible for the retention of urates and other inorganic salts. So it is obvious that the pathology of kidneys under certain conditions, is reflected on that of the intestines and *vice versa*.

The apparent vicious cycle is that the toxic materials of any origin in the ingesta have an immediate effect on the intestinal wall together with a remote effect on the kidneys when they are absorbed in the blood stream and carried to the latter by way of circulation.

Various inorganic and organic materials (Runnels, 1946) and the bacterial toxins metabolized from the digestive tract when brought to the kidneys by way of circulation inflict injury on the glomeruli and the convoluted and collecting tubules. The specialized glomerular and tubular cells are extremely sensitive to irritants; therefore, they become sick and undergo cloudy swelling, hyaline and fatty degeneration or necrosis without any marked inflammatory reaction. Such condition is usually almost devoid of vascular and exudative changes; hence it differs from nephritis. In cloudy swelling the kidneys are swollen and the cut surface bulges out. In other words, they become pulpy and assume a cooked appearance. Microscopically the cells are swollen, particularly those of the convoluted tubules; their protoplasm becomes opaque and granular. The swollen cells project out into the lumen of the tubules; some rupture and discharge the granular protoplasm into the lumen. These granular materials clump together and form hyaline casts, and some may be detached from the basement membrane and mixed with the hyaline materials.

As a result of the toxic effect an abnormal quantity of neutral fat occurs in the epithelial cells, particularly those of the convoluted tubules. The nuclei undergo degeneration and as such the desquamated cells unite with one another in the lumen of the tubules to form yellow coloured streaks running from the pelvis to the cortical surface through the medulla. Grossly the kidneys become enlarged, soft and greasy to feel and yellow or yellowish grey in colour.

According to the nature of morbid changes in the tubules there are two types of tubular degeneration (Boyd, 1947): one is toxic nephrosis and the other is lipoid nephrosis. The mild irritants attack the highly specialized cells of the renal tubules. There is no classical glomerulonephritis as there was no engorgement of the glomerular tufts and consequent obstruction and anuria. On the contrary, the glomerular capillaries become abnormally permeable which explains for low plasma protein, massive œdema, ascites, etc. There is no acute attack of glomerulonephritis nor do the patients suffer from renal insufficiency. There is disturbances in lipoid (cholesterol) metabolism due to defective renal filter (hyperpermeability to plasma proteins). When the plasma proteins of the

dog are kept low by continued removal a typical picture of the lipoid nephrosis develops.

The gross appearance of the kidneys (Bell, 1947 and Runnels, 1946) shows numerous yellowish streaks and patches of lipoid. Microscopically, the striking change is the degenerative lesions in the convoluted tubules, the cells of which contain both neutral fat and cholesterol ester. The latter appears as bright, doubly refractile bodies when frozen section is examined under Nicol's prism. The hyaline droplets are more vivid in lipoid nephrosis than in toxic nephrosis. There may be generalized dilatation of the tubules with atrophy of the epithelium. The basement membranes of the capillary loops are thickened but they themselves are dilated. The longer the disease lasts the more widespread and pronounced are the lesions. As the condition advances the capillary wall becomes more and more thickened and the lumen is narrowed down, so the renal insufficiency and hypertension begin to develop.

The essential lesion in nephrosis is, therefore, glomerular, a dilated state of the glomerular capillaries and a hyaline change. These allow the plasma proteins to escape. In nephrotic condition all the glomeruli are in simultaneous action and their capillaries are dilated with concomitant diminished supply of filtrate in the tubules at a time so that the total volume of urine is decreased.

Renal insufficiency (Hutyra *et al.*, 1946a and 1946b) occurs in cases of water depletion due to severe diarrhœa. It favours retention of the product of protein metabolism and ultimate onset of uræmia.

True uræmia manifests itself in general loss of strength; great dullness; fibrillary contraction of the muscles; increased reflex contraction of the pupil; deep, slow and intermittent breathing; loss of appetite; vomiting of the urinous smelling materials; rapid emaciation; diarrhœa indicative of inflammatory lesions (stomatitis, gastro-enteritis) and hæmorrhages.

The organic and inorganic poisons and bacterial toxins are the causes of renal degeneration. They include phosphorus, mercury, arsenic, carbolic acid, tar derivatives, etc. The digestive disturbances in dogs (*e.g.*, gastro-intestinal catarrh, constipation, colitis, helminthiasis) in which the toxin formed by the intestinal micro-organism and abnormally fermented products are absorbed and excreted by the kidneys. Unsuitable diet appears sometimes to be the cause of renal degeneration.

It appears that the organism (*E. coli*) escapes from the digestive tract (Hagen, 1947) into the blood stream and disseminated in all parts of the body about the time of death.

Most of the cases of colibacillosis (Merchant, 1948) are provided by E. coli; in fact, all young animals are more susceptible to this organism than the old ones. It has also been associated with pyelonephritis.

Streptococci (Runnels, 1946) sometimes act as secondary invaders of the intestinal tract and through the erosions they are absorbed in the blood stream and carried to the kidneys producing focal nephritis by direct degenerative action on the glomerular tufts and causing them to slough.

If the case is a favourable one, the renal change, *i.e.*, necrosis of the capillary tuft varies from early glomerular necrosis to healing and ultimate fibrosis.

Wyssokowitch in 1886 (quoted by Bell, 1947) found that the bacteria are excreted by the kidneys immediately after injection into the blood stream. Staphylococcus did not appear until several hours had been passed. Less virulent organisms were absent until twentyfour hours of injection. Since the numerous experiments have found that bacteria appear in the urine within a few minutes of the injection, Helmholz pointed out in the year 1925-26 that the technique for obtaining urine was most important as in fifty per cent of the cases contamination had taken place when the urine was collected by means of a catheter and a false positive result was obtained if any blood got into the urine. So abdomen and urinary bladder should be opened aseptically and urine collected for examination. With this method it has been found that the streptococcus appears after twelve hours and *E. coli* after twentyfour hours. This delayed appearance was indicative of the excape of the organisms through the minute lesion in the glomeruli which they induced, as the normal glomerular membrane is impermeable to bacteria. The definite glomerular abscess may be found within twelve to twentyfour hours.

On a low protein (Boyd, 1947) but high carbohydrate diet all animals (rats) recovered whereas on a high protein but low carbohydrate diet they succumbed to chronic progressive nephritis. The seat of greatest tubular damage in high protein group was the proximal end of the convoluted tubules.

Helminthiasis (Hutyra *et al.*, 1946a and 1946b; Monnig, 1947) of the intestinal tract causes frequently kidney lesion which is either due to absorption of the secretion and excretion of the worms or due to injuring the intestinal epithelium and mechanically paving the way for the invasion of the blood stream by both the molicular and cellular toxic substances; which in turn have a detrimental effect reflected on the kidneys especially the highly functional epithelial cells of the convoluted tubules and to a lesser extent on those of the glomeruli; and in such cases both the conditions, *i.e.*, nephritic and nephrotic lesions are generally present (Boyd, 1947).

Intestinal cattarrh (Hutyra *et al.*, 1946a and 1946b) may lead to the absorption of the toxic substances produced during protein metabolism either in the food ingested or afterwards when it is subjected to the digestive processes in the intestines. The absorption of such toxic materials is being normally prevented

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by the healthy epithelium and digestive enzymes. In the diseased condition of the intestines either the bacterial toxins or the bacteria themselves are also absorbed in the blood stream and transmitted to the distant organs and thus they come in contact with the susceptible tissues and injure them.

Materials and Methods

Studies were conducted on three more or less prolonged cases of canine enteritis. Necropsy was performed as early as possible following the death of these animals to avoid least post-mortem changes to take place. The pathologic specimens of both intestines and kidneys of the respective dogs were collected and preserved immediately. The gross and histopathologic lesions were carefully observed and recorded individually.

Observation and Results

Case 1—The subject of this report was a dog aged about 5 years. It was a case originated in the year 1948 and presented for autopsy.

Clinical Symptoms: Dullness, anorexia, tenderness of the abdomen, foul breath, coated tongue, pyrexia of varying degree, colicky pains, tenesmus with greenish mucoid semifluid fæces of characteristic fishy smell and tinged with blood, high coloured urine, exhaustion and death in about ten days.

Necropsy Study: *Intestines—Macroscopic Observation*: The mucous membrane of the intestine was covered with thick slimy and tenacious discharge rich in mucin and greenish or greyish in colour. The vessels were engorged with blood. The mesenteric lymph nodes were slighly enlarged and had a puffy feel due to excess of lymph in them. The necropsy diagnosis was catarrhal enteritis with moderate congestion of the intestinal wall.

Histopathology: The muscular layers showed signs of œdema here and there and the muscle fibres were distorted and torn. Some of the muscle cells around the distended area underwent karyolysis and their protoplasm became opaque. There was evidence of œdema between the layers of longitudinal and circular muscular fibres with the infiltration of fibroblasts mostly and a few round cells. The submucous layer was œdematous which in most places was separated from mucosa muscularis and the vessels were mostly engorged and some were hæmorrhagic. Muscularis mucosæ was œdematous, congested and hæmorrhagic with scattered infiltration of round cells. The basement membrane of the epithelium was rather swollen and œdematous. Some neutrophils made their appearance here. The morbid changes were chiefly observed in the epithelial layer. The epithelial cells were swollen and œdematous. The crypts and the glands were filled up with desquamated cells, debris and mucin. There was profuse infiltration of small round cells and polymorphs with a few plasma cells. The nuclei of the polymorphs showed segmentations more than the usual ones making the pathology more explicit. There was excoriation of the tips of the villi. The entire mucosa showed congestion and its swollen epithelial cells underwent karyolysis, pyknosis and karyorrhexis. The discharge in the lumen comprised desquamated epithelial cells, round cells, neutrophils, ghost cells, goblet cells and mucin.

Kidneys—Macroscopic Observation: The kidneys appeared to be firmer in consistency than normal with certain amount of hyperæmia. They seemed to be somewhat enlarged and the capsules could be easily peeled off. The surface of the kidney was finely granular with small cysts here and there. The cortex contained yellowish streaks on the cut surface and it was wider than usual. There was no appreciable change noticed in the medulla.

Histopathology: The glomeruli showed moderate congestion. There were desquamation of both endothelial and epithelial cells and infiltration of round cells. The protoplasm of certain cells became cloudy and some showed coagulation necrosis. There was formation of hyaline rings between the capillary loops and the Bowman's capsules. The capsules (Bowman's) were distended and there was tendency to the atrophy of the capillary tufts. In a few places the glomeruli had an inclination to slough off. In some of the Bowman's capsules there was the presence of desquamated capsular and capillary epithelium but mostly the simple capsular distension was noticed. In the tubular lumen there were evidences of cloudy swelling, coagulation necrosis, sloughing of the epithelium and formation of granular casts and hyaline droplets. The cell debris and casts with desquamated cells caused partial or complete occlusion of the lumen of the tubules thus causing the proximal portions and respective Bowman's capsules to be distended with the backed up urine. The proliferation of connective tissue cells and round cell infiltration in the interstices of the tubules were observed.

Case 2—It was a 4-year old dog presented for necropsy during the year 1948.

Clinical Symptoms: Loss of appetite, dullness, tender abdomen, foul breath, fever, colicky pains, tenesmus, greenish mucoid semisolid fæces frequently tinted with blood, dark coloured urine, exhaustion and death in eight days.

Necropsy Findings: *Intestines*—Macroscopic Observations: The intestinal mucosa was covered with fairly thick mucinoid deposits greenish in colour. It was reddened and swollen to some extent. The vessels were engorged with blood. The mesenteric lymph nodes were swollen and puffy owing to the excess of lymph in them. The necropsy diagnosis was intestinal catarrh.

Histopathology: The microscopic appearance was almost similar to that of Case 1 but œdema, congestion and coagulation necrosis with the infiltration of fibroblasts, round cells and polymorphs were more vivid. There were desquamation of epithelial cells and excoriation of the villi in a large scale. The intestinal contents consisted of desquamated epithelial cells, round cells, neutrophils, plasma cells, ghost cells and mucin.

Kidneys—Macroscopic Observation: The kidneys were firmer, enlarged and congested than normal. The surface was finely granular and capsules were removed easily. The thickened cortical portion showed yellowish streaks on the cut surface. The medulla appeared to be normal.

Histopathology: Some glomeruli were congested and distended. There were evidences of desquamations of endothelial and epithelial cells, cloudy swelling, coagulation necrosis and round cell infiltration. Some capillary tufts sloughed off. The degenerative changes in the tubular epithelium was in the form of cloudy swelling and coagulation necrosis. The granular casts and hyaline droplets thus

formed occluded the tubular lumen to the extent of causing distention of the proximal portion of them and the relating Bowman's capsules with urine flowing back. The fibroblasts and round cells infiltrated in the intertubular spaces suggesting the proliferative changes.

Case 3—This case was presented in 1948 at the age of about 2½ years. The post-mortem examination was performed as an usual procedure. It was treated for hook-worm infestation when alive.

CLINICAL SYMPTOMS: Lassitude, impaired appetite, foul breath, fever, tenderness of abdomen, greenish, offensive odour and semi-fluid fæces with traces of blood, defæcation often accompanied with tenesmus, emaciation, exhaustion and death in about seventeen days.

NECROPSY FINDINGS: *Intestines*—MACROSCOPIC OBSERVATIONS: The mucous membrane was slightly red and covered with viscid and cloudy mucus. The fairly enlarged mesentric lymph nodes contained excess of lymph. The intestines were markedly swollen and the post-mortem diagnosis was intestinal catarrh.

HISTOPATHOLOGY: The microscopic changes were more or less similar to those of the foregoing cases. The œdema and the cellular infiltration were most prominent. The swelling of lymph follicles and Payer's patches was marked. The villi were swollen and excoriated. The epithelium was desquamated, eroded and ulcerated at places.

Kidneys—MACROSCOPIC OBSERVATION: The kidneys were slightly smaller and firmer than normal. The usual architecture was somewhat altered. The surface was finely granular but sparingly cystic except in some localised roughened areas of healed up infarcts. The capsules could not be stripped as easily as in other cases presumably due to spotted cicatricial tissue of the infarcted areas. Fine greyish-yellow streaks were noticed in the cortex on the cut surface.

HISTOPATHOLOGY: The microscopic changes were a bit complex in this case. The proliferative changes were more conspicuous. There were cloudy swelling, hyaline and fatty degenerations, coagulation necrosis and the desquamation of renal epithelium. Atrophy and hyalinization of some glomeruli were observed with thickened Bowman's capsules. Other changes were analogous to those of the cases described before; nevertheless, the nephrotic lesions appeared to overshadow all the existing conditions.

DISCUSSION

From the facts reviewed and the actual observations made while studying the pathologic conditions of both intestines and kidneys of each of the three dogs with history of subacute or chronic enteritis, it becomes conspicuous that enteritis when it lasts for a longer duration incites both nephritic and nephrotic lesions in the kidneys of the respective animals. As a general rule (Boyd, 1947) the nephritic lesions are dormant and are being predominated by nephrotic lesion; eventually, the degenerative process of nephrosis overhadows the inflammatory changes of extremely mild type. As a matter of fact the mild irritation of the toxic substances originating from the metabolic process under abnormal conditions of the intestines, sets up a subclinical form of glomerulonephritis first and the degenerative processes spread to the epithelium of the convoluted tubules subsequently where the nephrotic changes are pronounced so much so that the inflammatory reaction is almost at the borderline of losing sight of the investigators.

If the nature of irritation is analyzed it becomes obvious that some toxins or toxic substances proper set up such a low grade uniform irritation (Boyd, 1947 and Runnels, 1946) that there were no rapid necrotic changes in the glomerular tufts to completely fill in the capillary lumen as observed in acute glomerulonephritis thus obstructing the normal circulation of blood through them with the resultant suspension of the process of renal filtration; on the contrary, the gradual hyalinization of the glomeruli induced moderate hypertension and increased hyperpermeability. This accounts for the albuminuria, low plasma protein and tendency to retention of fluid in the tissue; in other words, dropsy particularly noticeable in abdomen and other dependent parts. Hydrocardia and hydrothorax are also not infrequent under these conditions. The toxins of helminthic origin (Moonig, 1947) also act similarly.

The pathological changes in the convoluted tubules cause the diseased cells to swell and project into the lumen. These cells slough off and form granular, hyaline and cellular casts; also at places they occlude the lumen of the tubules partially or completely, causing the distention of the proximal end with urine. The urine in these tubules backs up and causes distention of the Bowman's capsule and atrophy of the glomerular tufts due to the increased intracapsular pressure. The hypertension of the capsular wall causes atrophy of the epithelium and in some places proliferation and thickening of the basement membrane in the long run, especially where the pressure is lower and the irritation is milder in nature than the former. Continual hyalinization and proliferative changes cause thickening of the capillary wall of the glomeruli and the occlusion of the uriniferous tubules thus accounting for oliguria in the later stage of the disease. The condition of oliguria as viewed by some workers is due to throwing all the glomeruli in action owing to the diffuse irritation of mild nature with a low rate of filtration (Boyd, 1947) from each individual glomerulus under such circumstances. This is again coupled with the partial or complete state of tubular occlusion and distension resulting not infrequently in slowing down the flow of urine from the kidneys. However, such dysfunction of the kidneys or renal insufficiency (Boyd, 1947 and Runnells, 1946) favours retention of the organic materials of metabolism together with the toxic substances (toxins—both molecular and cellular which are already absorbed in the blood stream) and water terminating in hydræmia, uræmia and death. It is now apparent that the products of metabolism retained under such circumstances affect severely the already diseased gastrointestinal tracts thus aggravating the pathologics of the same furthermore. So this

relates the mechanism, how the renal disease of certain type is reflected on the stomach and intestines and predisposes them to some morbid conditions.

In speaking of the cellular toxins absorbed from the intestines, they bring about sloughing of the glomerular capillary directly causing hæmaturia and ultimately anuria due to clogging of the tubules with the ultimate result described above. They may also set up focal glomerulonephritis or focal suppurative nephritis (Bell, 1947; Boyd, 1947; Hagan, 1947 and Runnells, 1946) which is very common when there is absorption of the organism like *streptococci, E. coli,* etc. But more commonly the toxins of these organisms invade the kidney tissues earlier than the organisms themselves. The mechanism as explained is that under inflammatory condition of the intestinal tract the normally inhabiting organisms which are almost non-pathogenic or only slightly pathogenic enter the mucosa or submucosa and liberate toxins which are absorbed in the blood stream and in turn invade the renal tissues. Some are of opinion (Boyd, 1947 and Runnells, 1946) that since renal affections are common amongst animals used for the production of biologics as a result of antigen-antibody reaction (anaphylaxis); so the reaction of antibody, produced by the toxins already absorbed under apparently healthy condition, with the specific organism occurs when it gains access to the blood stream and is carried to the already sensitized tissues. This factor is still in hypothetical stage and needs more intensive studies before it takes the form of one of the many definite ætiological factors of such ailments. Similar reason influences the allergic theory of certain protein shock terminating in intestinal and kidney lesion simultaneously when the animal receives diet rich in protein for a certain length of time.

As regards chemical poisons they cause intestinal symptoms first and thereby facilitate their absorption and eventual invasion of the highly sensitive renal tissues with consequent toxæmia due to the suspension of the mechanism of filtration owing to the acute glomerulonephritis thus resulting in the accumulation of the toxic agents in the system more and more which not infrequently ends in fatal termination.

Water depletion in diarrhœa as a result of enteritis is also a factor of renal insufficiency and uræmia; and it should not be lost sight of.

In this connection it may be mentioned that some kidney affections with renal insufficiency and consequent accumulation of the by-products of protein metabolism are associated with the hydropic condition of the gastro-intestinal tracts originating from the hypertension of the vessels of those organs. When such condition is a prolonged factor the inflammatory and degenerative changes happen to usher in.

In conclusion, it is pointed out that due care should invariably be taken for the pathologically related organs while tackling with the disease of any one of them; as the affection of one, in all its likeliness, has a tendency to incite that of the other. Thus the condition of the patient becomes complicated by making the chances of recovery more and more remote.

Summary

Three cases of canine enteritis are studied both grossly and microscopically. The macroscopic and the histopathologic changes in the intestines and kidneys of these dogs have duly been recorded. The morbid changes of the intestines and those of the kidneys are respectively similar in all the three cases. From the result of the findings in these it has been apparent that there is a relation between the pathologics of the intestinal tracts and those of the kidneys as the diseases of one frequently incite the varied degree of morbid changes in the other. Accordingly, as a matter of principle, due care should invariably be taken for the prevention of the secondary affections of the latter before they make their headway as the complications to the diseases of the former. Similarly, the diseases of the former often usher in as a consequence to the primary affection of the latter. Therefore, this pathologic correlation should be foreseen in dealing with the diseases either of the intestines or of the kidneys. If this point is overlooked or ignored, the diseases of one mounted with the usual complicated pathologics of the other augment fatal termination rather than rapid cure.

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HYGIENE OF THE ANO-PERINEAL REGION

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The common diseases that are so ubiquitous in our tropical country and which for obvious reasons men and women often conceal, are well-known to us and they are noted below in order of prevalence:

(1) Rigworm.
(2) Tineal infections and scaboid infections.
(3) Excoriation and pruritus.
(4) Fissures, fistulæ and piles.
(5) Chronic discharges from rectum and vagina and their effects on the adjacent structures.
(6) Spermatorrhœa, nocturnal emissions and frigidity.
(7) Prostatic involvement and tension.
(8) Mental disorders as a result of any of the conditions mentioned above.

(1) *Ringworm*—This as we all know is a very difficult disease to cure, specially when it involves the inguinal forks. Like a cat it has many lives and it is a common experience that many of the antiparasitics that we apply cure it for the time being, specially in the winter, only to reappear in the sweating season. There are myriads of ringworm ointments but I do not know one which will in a reasonable time eradicate it completely. As a surgeon I had the very painful experience of local sepsis happening after a careful aseptic operation on the part after an apparently thorough preliminary treatment of the ringworm. This is a potent cause of most of the other conditions named in the series.

(2) *Tineal and scaboid infections* are also prolific sources of irritation of the parts and make the person most unhappy at times. That tineal infections and chronic scabies of the prepuce, scrotum and anal region long remain undetected and if detected only improperly treated specially in a female in our country for scarcity of women doctors is a common experience with us. The chronic irritation that leads to the uncontrollable scratching specially in the night time, leading to the ruinous habit of masturbation both in the male and female and the ruinous mental condition that it leads to, are within the experience of all of us. I want to specially stress on the incomplete treatment that we can give to these fungal diseases for want of sufficient privacy in the ordinary household, hostels and boarding houses, and this leads to much suffering to the afflicted.

(3) *Excoriations and pruritus*—Faulty hygiene of the anoperineal region is often a contributing cause of these most troublesome diseases. The habit of cleaning the parts after defæcation with water is certainly a very laudable one in our country, as distinct from the practice of using toilet papers (often of the wrong variety such as newspapers and the thick waste paper) or of wiping out with a split bamboo or other twigs as is prevalent in the Far East, but the fault lies with most of our people in the wearing of long nails and splashing of the water to and fro leading to infection of the vaginal orifice and the scrotum with the fæcal discharges which may contain *Ent. histolytica* or ova of the trichuris, trichomonas and flagellates leading to infection. It has been my experience to meet with chronic vaginitis due to any of the above-mentioned parasites and there have appeared many articles in the medical publications of such vaginitis or prepucial infection not being cured until appropriate specific treatment has been given. The wearing of long nails by the people of our country for superstition or negligence is a habit which cannot but be one of the most potent causes of these excoriations and fissures, leading to perineal abscesses and fistulæ and to external piles as well.

(4) *Fissures, fistulæ and piles*—Except for internal piles which are due to chronic turgescence of the inferior hæmorrhoidal veins and are connected with incomplete defæcation, hard fæcal masses and stasis in the portal circulation, the other conditions mentioned above are very much due to want of local hygiene. The turgescence of the anoperineal veins, due to chronic irritation is very conducive to formation of these painful and chronic diseases and if not properly treated, if necessary by surgery, is a very potent cause of chronic irritation.

(5) *Chronic discharges from the rectum and vagina*—There are many conditions which may lead to these troublesome symptoms and are very often neglected. Is it not our experience that leucorrhœa in women is not only never investigated properly on account of social secrecy that hangs about it and the superstitious belief in the sufferers of this condition being the cause of many of their ill health, leading them to obtain medical advice of us male doctors who seldom have the chance or facility of examining the victims properly and we dose them with nostrums of all sorts, leading from Aletris Cordial and Vibro Asoke to many nondescript patent medicines in vogue, copying the method of the votaries of the other pathies? In my opinion unless we get the proper facility for examination of the rectum or the vagina with the consent of the patient we should not perfunctorily prescribe. How often do we miss to find the real cause of a chronic discharge from the rectum and the vagina for not examining the parts with a speculum and also for not exploring with our gloved fingers the conditions that lie behind the orifice for the presence of these discharges. It may not be possible for the circumstances of our poor patients to have the discharges examined microscopically but no one should treat these

chronic discharges with the quack's method of prescribing anusol or a similar ointment or with a wandering midwife's method of giving douches with potassium permanganate with her douche can which is very seldom sterilised and adequately cleaned, and the nozzle enters seriatim in a gonorrhœal vagina, ulcerated cervix and to many other pathological conditions that cause these diseases. It is our duty to explain to the patients and the attendants to use very carefully these douche cans with their accessories, only after the parts are properly sterilised and sterile lubricants used.

(6) *Spermatorrhœa, nocturnal emissions and frigidity*—This is a subject in which volumes can be written by the psychopaths and lay people. The conditions are the favourite hunting ground for the quacks and the physicians of other systems and some of us, so-called allopaths, may also be accused of trying luck with the different kinds of injections with gonadotropic hormones and allied advertised drugs like Okasa. These diseases are to my mind more of a physiological disturbance than a pathological entity in an otherwise healthy individual and to my experience is closely connected with negligence of anoperineal hygiene. The irritation of a tight foreskin with inspissated smegma, the presence of pediculi and scabies, the irritation of threadworms and engorgement of the prostate for faulty habits, and the turgescence in the anal and vesical veins in the trigone of the bladder are all contributory causes which we do not take into account when treating this condition. The symptoms that these poor patients have to experience are various. The latter condition is also evinced by female patients and it is well-known what the contributory causes are. The condition in the adult male leads them to psychoneurosis of varicus sorts and even to committing suicide. Yet our medical text books give no comprehensive idea about the ætiology and treatment. The psychopaths wax galore but it is mostly idle talk ending in a suggestion of *mesmerism* to cure them.

Now I will leave over the 7th derangement to them and will ventilate my idea as to what are the faults in personal hygiene.

(*a*) The wearing of tight clothes and underwears which favours sweating in our tropical climate and leads to non-ventilation of the parts and the consequent ever-present moist condition that favours the growth of all fungal and parasitic diseases and leads to chronic irritation of the skin of the part. I think it is time when we preach this hygiene and ask our young men to give up the habit of wearing an underwear under the loose dhuti and the wearing of the tight *langoti* and the recent habit of wearing trousers tight at the waist and fork. I also think we should ask our sisters and daughters to wear belts for keeping the underskirts intact instead of tying with a string, which not only constricts their abdomen but also makes the fringes rub their perineum while sitting and squatting and doing housework. One of our profession who has lived long enough must have contrasted the healthy smooth skin of cur mothers and aunts, who had only a saree to wear in the house and a cover of chaddar when they used to go out, with the ringworms in the loins and the pubes and the umbilicus of many of our sisters and daughters who have augmented their clothing and covering. I do not say that they should discard their choli and the skirt but I want them to make it loose so that there is proper ventilation of the parts.

(*b*) I think it is necessary to insist on all boys who have a tight foreskin to have it removed and teach them to use soap and water in cleaning the smegma daily and to perform their rectal ablutions in such a way as to wash from front to behind and not *vice versa* which is specially injurious to the female sex. It would have improved the well being of the whole nation if we could improve their living condition by the more liberal use of soap and water after defæcation but such plain things as the cutting of the nails regularly, as also scrupulous cleaning of the nail beds can certainly be taught by the elders.

(*c*) It is of great importance in our country, in which hot and moist conditions are more prevalent that the prevention of fungal and parasitic diseases are practised, and at the slightest show, the hairs should be shaved by a practised hand and fungicidal substance used. To prevent fresh attacks I have mainly relied in my practice, which I am not ashamed to say, that I practise myself, a rubbing with a pledget of cotton wool soaked in methylated spirit preferably with a small amount of fungicide like Hydrargyri iodidi rubra and potassium iodide to make it into a biniodide lotion, the celebrated No. 2 solution of the Hospital where we are trained. The anal region and the perineum should be well rubbed in the parts when the portion is dry and let the lotion remain until it stings gently and it will prevent any of the irritable diseases growing. Prepared in bulk this should be a cheap application within the means of most of us including our patients and I am sure it will lead to a more healthy existence and prevent the formation of fissures, external piles, anal abscess and abscess of glands like the Bartholin's in the female and of the labia, as also the pubic pediculitis so distressing and troublesome to them.

(*d*) I would advise all those suffering from piles, both internal and external or having such a tendency, to use soap foams in their fingers to insert into the anus and massage the anorectal opening and reduce the turgescence of the veins there daily. If there is any pain some bland oil like that of cocoanut, olive, arachis or sesame can be dipped by the finger and used in the replacement of prolapsed piles and massaged daily. I have no reference books with me but many of us must have read this advice from eminent physicians in the East and West to prevent the numerous complications that follow in the wake of fistulæ, fissures and piles and the other conditions of the lower rectum.

(*e*) I have now to advocate a massage of the prostate for many of our diseases beginning from fibrositis to mild arthritis, as also the other diseases of the system, to which a chronic mild prostatitis leads to, often undiagnosed and often fed on salicylates and like substances without much benefit but with definite harm. I like also lastly to bring out my recommendation for a regular prostatic massage for all neurotic sufferers of the male variety who get sparmatorrhœa, nocturnal or involuntary seminal emissions and frigidity as I have found it useful to direct their sex instincts from the front to behind and if we remember the physiology of the prostatic glands in their excitator and gonadotropic functions, we can easily surmise why this is beneficial. This, however, will lead to discussion of the sexual functions of the male and female, which are taboo in good society and is also tabooed in the medical profession as it stands at present and so I would earnestly request you to give your opinions as to where this logic is faulty and give me illumination. Our function as medical men, I believe is pre-eminently preventive and so we must think of the well-being of the society in all its aspects.*

CASE NOTE

A CASE OF CHRONIC MYELOID LEUKAEMIA WITHOUT HEPATO-SPLENIC ENLARGEMENT

AMAL CHAKRABARTI, M.D. (CAL.),
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The ætiology of leukæmia, till to-day remains as obscure as it was ever before. Claims have been made from time to time to substantiate the hypothesis of infection. The clinical manifestations of the disease, the widespread systemic disturbance, simultaneous involvement of different organs and tissues, experimental transmission of the disease in animals by cell-free filtrate point to infection as the cause. Claims were also made to have isolated from the urine of the patients suffering from leukæmia, distinct myeloid and lymphoid substances which have been supposed to work in balance to control normal leucopoiesis; lymphoid substances causing proliferation of lymphoid series of cells, myeloid substances arresting their proliferation and thereby helping maturation and *vice versa*. Excess of myeloid or lymphoid substances by altering this balance have been supposed to precipitate one or the other variety of leukæmia. These theories however, have not since been confirmed. The neoplastic theory finds subsistence in high incidence of leukæmia in workers long exposed to radiations, chemicals and heavy metals etc., and also to occurrence of tumourlike leucocytic masses in some cases. Theories, however, have to be proved to establish the ætiology and till then the aberrant manifestations of leukæmia, reported from time to time, will present problems, difficult of understanding. The aleukæmic phase in leukæmia, leukæmoid blood picture in a group of disorders collectively called leuco-erythroblastic anæmia are instances in point. In myeloid leukæmia, in addition to bone marrow, both spleen and liver take active part in abnormal leucopoiesis and hence enlarge. In very acute forms of leukæmia, death may occur even before the spleen becomes enlarged clinically, but in chronic myeloid leukæmia absence of hepatic or splenic enlargement is a very rare occurrence. Such a case of chronic myeloid leukæmia without hepatic or splenic enlargement, till the moment of death, two years after the diagnosis was made, is reported below.

Case Report

G.P.N., hindu male, aged 72 years, was first seen by me on 11-4-49. His chief complaints were, continued fever for 14 days with irregular variations, constant headache, aches in limbs and general lassitude. Past history disclosed a life of dissipation in early youth. Early manifestations of syphilis were controlled with antisyphilitics but the treatment was irregularly and imperfectly carried out. He had duodenal ulcer in adult age, imposing on him, dietetic restrictions since. He was declared a diabetic in his sixtieth year. Even with these trails of devitalizing diseases and in spite of his old age, he was cheerful and always in good humour, till recently, when irregular febrile bouts, the present one being the third in series, weakened him considerably physically and mentally.

On examination, he was found to be anæmic, slightly dull and asthenic. Abdomen—soft with no tympanitis; liver or spleen—not palpable: lymph glands—not enlarged. Neck—soft; cranial nerve abnormality—nil; heart—N.A.D.; lungs—N.A.D.; no difficulty experienced with urination; Renal angle—N.A.D.; B.P. 128/82 mm. of Hg.: urine—a trace of albumin only.

Report of blood slide sent for differential count was however something rather unexpected: *e.g.*, (15-4-49)—W.B.C. 50,000/c.mm. myelocytes plenty. Blood count was repeated again. (17-4-49)—W.B.C. 62,800/c.mm. myelocytes 8 per cent: total R.B.C. 3,420,000/c.mm.; Hb—65 per cent. On ophthalmoscopy, no myeloid infiltration could be seen. Prostate on examination revealed no hard mass or irregular nodular elevation. In the absence of evidence of other conditions, likely to lead to myeloid blood picture in this case, a diagnosis of an atypical form of myeloid leukæmia was made.

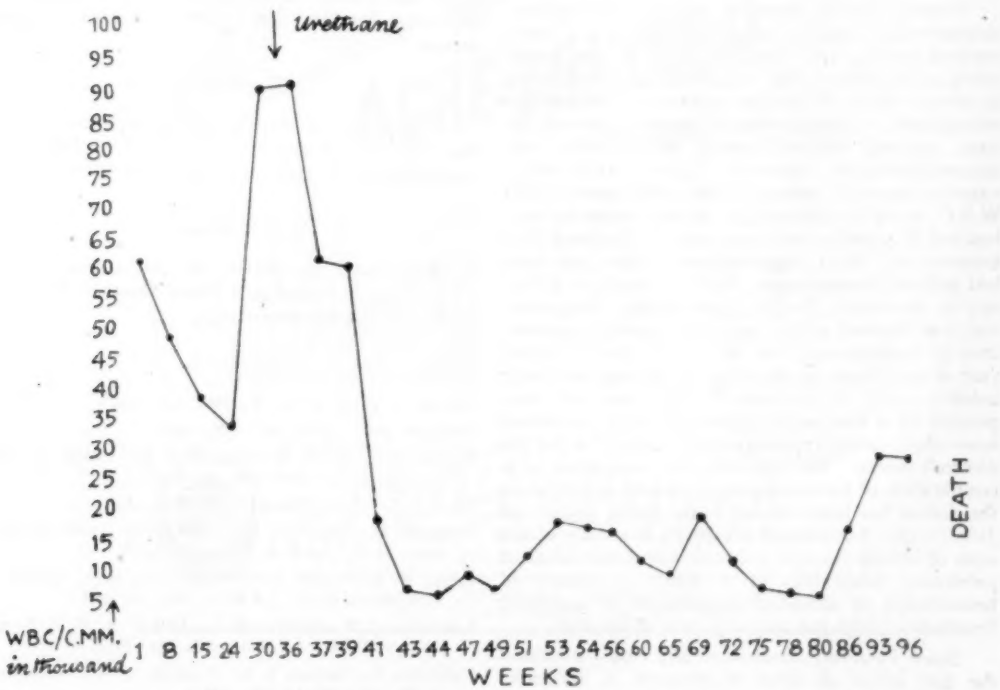
His fever was controlled spontaneously in a week's time. He, however, left Burdwan but returned again after eight months. During this period, he had no treatment for leukæmia, though he was careful enough to keep a periodic blood count record. Before commencing treatment, a fresh blood count was ordered and it revealed a very high figure for leucocytes *e.g.*, (6-1-50)—W.B.C.—92,000/c.mm., myelocytes plenty. Urethane was started: The dose given was 3 gm.daily in three divided doses. Besides, he was advised hæmatinics, tonics and a diet as for diabetics. After 5 weeks, W.B.C. count fell to 8,000/c.mm. with disappearance of

* Read at a clinical meeting of the Nabadwip Branch, I.M.A. on 1-11-50.

immature leucocytes. Concurrently, anæmia improved considerably and in 6 weeks, R.B.C. gain was a little over one million. Since then, with adjustment of urethane dosage, the range of W.B.C. count could be kept between 7,000-19,000/c.mm. It was, however, not possible to stop urethane completely any time because of progressive rise of count. In spite of apparently normal blood picture and improved hæmatological response with urethane which was all along

TABLE SHOWING EFFECT OF URETHANE ON W.B.C. AND R.B.C. COUNT OF PATIENT (G.P.N.)

Date	*W.B.C. count/c.mm.*	*R.B.C. count/c.mm.*
15- 4-49	50,000 (Myelocyte plenty)	
17- 4-49	62,800 (,, 8%)	3,420,000 (Hb 65%)
17- 6-49	48,600 (,, plenty)	
3- 8-49	38,000 (,, ,,	
7-10-49	34,000 (,, ,,	
20-11-49	90,000 (,, 20%)	
	Myeloblast 10%)	2,190,000 (,, 45%)
6- 1-50	92,000 (Myelocyte plenty)	2,150,000 (,, 60%)
14- 1-50	63,000 (,, ,,	2,600,000 (,, 70%)
21- 1-50	61,000 (,, ,,	4,000,000 (,, 80%)
4- 2-50	19,400 (,, few)	4,000,000
13- 2-50	8,000 (,, nil)	
	poly 87%)	3,600,000 (,, 60%)
20- 2-50	7,800 (Myelocyte nil	
	poly 84%)	
9- 3-50	14,200 (Myelocyte few	
	poly 85%)	4,150,000 (,, 85%)
20- 3-50	11,000 (Myelocyte nil	
	poly 90%)	,, (,, ,,)
4- 4-50	14,800 (Myelocyte few)	,, (,, ,,)
16- 4-50	19,800 (,, ,,)	
23- 4-50	19,000 (,, ,,)	
8- 5-50	16,400 (,, ,,)	4,700,000 (,, ,,)
30- 5-50	11,000 (,, ,,)	4,800,000 (,, 90%)
7- 7-50	14,000 (,, 5%)	4,950,000 (,, ,,)
4- 8-50	19,000 (,, 14%)	3,850,000 (,, 75%)
20- 8-50	11,400 (,, ,,)	3,000,000 (,, 65%)
6- 9-50	7,400 (,, 12%)	4,000,000 (,, 75%)
25- 9-50	7,000 (,, 9%)	4,700,000 (,, 85%)
7-10-50	6,200 (,, 6%)	5,000,000 (,, 90%)
22-11-50	17,000 (,, few)	,, (,, 85%)
20- 1-51	28,000 (,, 6%)	4,650,000 (,, 65%)
23- 1-51	27,500 (,, 7%)	
25- 1-51	... ...	Patient died.



EFFECT OF URETHANE ON BLOOD COUNT OF THE PATIENT (G.P.N.) SHOWN IN GRAPHIC FORM.

maintained, weakness, lassitude and anorexia remained as usual. A search for other associated factors for this weakness failed to reveal the cause: *e.g.*, blood W.R. was negative; clinically there was no evidence of neurosyphilis. Blood sugar was seldom very high (160 mgm. per cent on average).

After a static phase for about eight months, on 28-12-50 he developed a mild-grade fever with chest pain and cough. The condition went on persisting and on the 7th day of this febrile bout, sputum examination revealed a few acid-fast bacillus. On 6-1-51 accordingly a skiagram of chest was taken. It showed patchy areas of exudative lesions with little reaction, bilaterally scattered. In addition to urethane and other therapeutics, therefore, he was advised dihydrostreptomycin sulphate ½ gm. B.D. and P.A.S. 12 gms. daily in divided doses for 5 days a week. With this treatment, the patient was progressing well but on 23-1-51 he had a sudden onset of high fever with rigor. He was delirious and restless. In blood slide, no M.P. could be seen; W.B.C. count was almost the same as three days ago with no further increase in myelocyte count. Urine examination revealed albumen in trace, with no pus cells and acetone; the patient semi-stuporous, legs and feet were puffy and slightly tender to the touch. It appeared to be advancing thrombophlebitis, result of protracted illness. He was given aureomycin by nasal catheter but even before 2 gms. could be given, the patient expired in a state of coma and deep exhaustion on 25-1-51. The liver and spleen were still not palpable.

Discussion

Chronic myeloid leukæmia without hepatosplenic enlargement is distinctly rare. Goodman *et al.*, (1946) reported such a case. Craver (1948) in his special article on lymphoma and leukæmia, mentioned about occurrence of chronic myeloid leukæmia without splenic enlargement. In the absence of hepatosplenic enlargement, myeloid leukæmia needs differentiation from leuco-erythroblastic anæmias. In leuco-erythroblastic anæmias, however, anæmia is the main feature: total W.B.C. count is seldom high (though counts up to a hundred thousand/c.mm. may occur.): In blood film, immature red blood corpuscles predominate and myeloid cells are inconspicuous. Further, anæmia is refractory to treatment. Besides hepatosplenic enlargement the case reported above had other notable features: thus (*a*) leukæmia was first detected in him in his 71st year of age, usual age of occurrence of leukæmia being below 50 years; (*b*) leukæmia in this case was complicated by a flare up of apparently latent pulmonary tuberculosis which probably was responsible for the downhill course. The importance of tuberculosis as a complication of leukæmia and its baneful influence on the disease has been referred to by Holler (1931) and Jaffe (1948). Lawrence *et al.*, (1948) in a study of 129 cases of chronic myeloid leukæmia found association of pulmonary tuberculosis in 6 cases; (*c*) absence of hæmorrhagic or ulcerative complication or associated lymphadenopathy was also a feature of the case.

Since Paterson, Haddow *et al.*, (1946) published the first report of effect of urethane in leukæmia, several reports of favourable effects have been published. It has been contended that results compare very favourably with nitrogen mustard therapy or radio-active phosphorus therapy. Effect is definitely superior to para- amino-benzoic acid therapy. Further, because of ease of administration, it is regarded as the drug of choice in chronic myeloid leukæmia. The case reported was treated with urethane throughout the course of illness: with urethane, after administration of 140 gms. in 5 weeks, the blood count could be brought down to the normal range; with a little modification of dose the abnormal leucopoiesis could be kept in check, maintaining an improved hæmatolcgical picture. Urethane, however, had to be used almost throughout the course of illness as temporary withdrawal was found to be followed by a sharp rise in leucocyte count. This finding is in disagreement with the statement of Hirschboeck, Lindart *et al.*, (1948) that fall of blood count continues even after administration of urethane is discontinued.

Mention has been made in literature about toxic effects of urethane. Thus Webster (1947) reported a case of death due to profound granulopenia occurring in leukæmia following urethane therapy. Possibility of pulmonary or hepatic malignancy from prolonged use of urethane has been hinted by Jaffe (1948) from experimental observation. In our case, almost uninterrupted use of urethane for a year was not followed by any toxic manifestation except occasional transient nausea.

Summary

A rare case of chronic myeloid leukæmia without hepatosplenic enlargement, complicated by pulmonary tuberculosis in an aged man of 72 years is reported.

Acknowledgment

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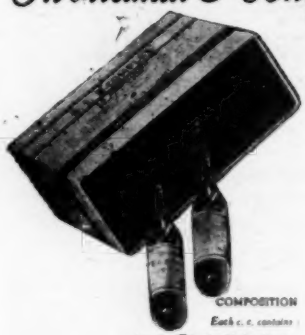

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ANAEMIA IN PREGNANCY

From the biological standpoint, pregnancy is a very interesting state wherein so many factors easily overstep the limit of normal and become pathological. For many ages, a certain amount of paleness of pregnant women was considered to be usual. Definite anæmia during pregnancy has been observed for long in the western countries. Balfour[1] pointed out similar findings in Indian women during pregnancy. Other reports [2 to 15] of anæmia in pregnancy have appeared from India as well as many other tropical and subtropical countries. Anæmia during pregnancy quickly became a serious cause for anxiety for medical men. Specially in the tropical countries anæmia was often found, particularly among those living on a protein-deficiency diet, with a marked tendency to premature labour causing a high maternal and infantile mortality[14, 15]. A macrocytic hæmatological picture was often found and hence, in the earlier years of study, a 'pernicious anæmia of pregnancy' was thought to be a very common form. It was soon found out, however, that a deficiency of iron was present in a very large number of women with anæmia in pregnancy, and attention seems to be focussed on this factor at present, while recognising the occasional presence of megaloblastic and the dimorphic types.

Minor degree of anæmia is fairly common; often, perhaps wrongly, termed 'physiological anæmia,' and thought to be due to a relative hydræmia in pregnancy causing hæmodilution. Modern methods of hæmatological study and research have, however, given us a closer insight and a better understanding of this problem. Recent studies [16 to 23], mainly using Evans Blue dye (T-1824), have shown that the total plasma volume increases during pregnancy up to an average of about 50 per cent, the peak of the rise being attained between thirty-second to thirty-eighth week of gestation. However, because of wide range of variations, the amount of blood volume cannot be predicted in any particular individual. Moreover, the changes in the plasma volume were found to be unrelated to the presence or absence of clinical anæmia. This increased plasma volume lessens slightly during the last month of pregnancy, but there is a steep fall in volume after parturition so that the non-pregnant volume is restored by about eight weeks postpartum. Red cells also increase during pregnancy but their increase is not evident before twenty-fourth week, because of the far more rapid increase of plasma volume. The total hæmoglobin mass steadily increases during pregnancy up to a maximum of about 15 per cent increase at term [16, 17, 20 to 24]. The total hæmoglobin mass is quickly restored to non-pregnant level by a sharp fall after delivery. The increasing hæmoglobin mass lags behind the increased plasma volume and bone-marrow hyperplasia by 2 to 4 weeks. As a result, the packed cell volume and hæmoglobin fall initially without change of the mean corpuscular hæmoglobin concentration; at the lowest point, hæmoglobin value gets reduced to 11 gm. per cent. The hæmatocrit reading falls during pregnancy down to minimum values of 28 to 38 per cent up to the third trimester, thereafter rising slightly to term. The rapid return, of the plasma volume and the total hæmoglobin mass, back to normal in so short time after labour, is not easily explained, as it far exceeds [20, 22, 24] the postpartal blood loss, and it is suggested that this may be due to loss of blood from active circulation, partly due to blockage in the body of the uterus. In a normal pregnancy, the mean corpuscular volume, mean corpuscular hæmoglobin, mean corpuscular hæmoglobin concentration, colour index and the appearance of the red cells do not vary much from the normal values for the non-pregnant woman. Along with a variable (14 to 121 per cent)[22] hydræmia there is thus, not a static, but a dynamic equilibrium at any stage of pregnancy. The term physiological or apparent anæmia thus indicates those cases where the hypervolæmia masks the usual increase

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24. Lowenstein, L. *et al.*—*Ibid*, 60: 1206, 1950.

of the total hæmoglobin mass. Abnormalities of the red cell seem to be the key findings in determining presence of pathological anæmia in pregnancy. It is usually agreed that a hæmoglobin level of less than 11 gm. per cent after mid-pregnancy would indicate true anæmia with deficiency of iron. Studies[25] in normal human pregnancy with iron tagged with radio-active isotope have shown that the uptake of iron increases with gestation to the extent that at 30 weeks and beyond, 3 times or more amounts of iron would be absorbed as compared with early pregnancy; this uptake being fairly equal in the mother and the fœtus. It is possible during pregnancy to drive the total hæmoglobin upward even in the absence of anæmia[23]. But it appears that this effect is not so great in early pregnancy as it is in the later months when a latent iron-deficiency state often exists [25, 26]. The reason for this is probably that the woman's needs for iron, which is obviously greater in the later months, is to some extent responsible for iron absorption from the intestines. Granick's[27, 28, 29] observations suggest that the iron-protein-phosphorus complex Ferritin is concerned in the absorption of iron by the apoferritin-ferritin mechanism of the intestinal mucosa. When serum iron levels are high, body stores of iron full, serum globulin accepts very little iron from ferritin with consequently lesser formation of iron-free apoferritin, in the absence of which iron passes through the alimentary tract unabsorbed, due to this 'mucosal block.' During pregnancy there is a specific increase in the concentration of the sub-fraction of the circulating β_1 globulin capable of binding iron[26, 30]. The enhanced binding power of the serum proteins in normal pregnancy and the rapid drop in the serum iron curve in late pregnancy[26, 31] are factors which make the uptake of iron possible at this time.

The treatment of anæmia in pregnancy is naturally complicated by the complexities mentioned above. It has been very aptly suggested[13] that, once the later months of pregnancy have been reached, the most helpful therapeutic measure in the patients with gross anæmia appears to be blood transfusion, repeated as required, till after delivery. Fortunately, however, such urgent treatment is called for only in a few cases. Macrocytic anæmia has long been treated with good success since Minot and Murphy[32] described the efficacy of liver extracts. Crude liver extracts yielded place to refined ones, and later on folic acid appeared to dominate the field. Since 1948, with the simultaneous reports, both in U.K. and in U.S.A.[33, 34, 35] of the newer component of vitamin B_{12}, many workers on anæmia in pregnancy tried this and have reported varying results[36 to 44] regarding the comparative efficacy between vitamin B_{12} and folic acid. It seems established that in megaloblastic anæmia folic acid and vitamin B_{12} are two fairly reliable medicaments with the practitioner. In hypochromic microcytic anæmia, however, the problem is not so easy. It has been estimated that an adult with hypochromic anæmia requires 24·5 mgm. of elemental iron to produce 1 per cent increase of hæmoglobin reading on the Haldane scale. For anæmia, iron was advocated by Sydenham in 1681, used by Rosenthal in 1872, and results of hypodermic injection reported by Stockman[45] in 1893. Oral medication with iron is not often well-tolerated by the patients who need it most; owing to frequent association, specially in the tropics, with nutritional disorders, helminthic infestations and achlorhydria—often histamine fast. Earlier attempts to by-pass the digestive system with injectable iron preparations did not meet with much success. But, since 1947, several authors [46 to 52] have reported favourably on intravenous iron, following the report of the use of saccharated iron oxide by Nissim[53]. Two recent reports[54, 55] record the satisfactory results obtained at widely separated centres in India. Various reactions, *e.g.*, pain in the arm,

25. HAHN, P. F. *et al.*—*Ibid*, **61**: 477, 1951.
26. VENTURA, S. AND KLOPPER, A.—*J. Obst. Gynæc. Brit. Emp.*, **58**: 174, 1951.
27. GRANICK, S.—*Chem. Rev.*, **38**: 379, 1946.
28. *Idem*—*J. Biol. Chem.*, **164**: 737, 1946.
29. *Idem*—*Science*, **103**: 107, 1946.
30. SURGENOR, D. M. *et al.*—*J. Clin. Invest.*, **28**: 73, 1949.
31. VENTURA, S. AND KLOPPER, A.—*South African M. J.*, **25**: 969, 1951.
32. MINOT, G. R. AND MURPHY, W. P.—*J.A.M.A.*, **87**: 470, 1926.
33. SMITH, E. LESTER AND PARKER, L. F. J.—*Biochem. J.*, **43**: Proc. viii. 1948.
34. SMITH, E. LESTER—*Nature*, London, **161**: 638, 1948.
35. RICKES, E. L. *et al.*—*Science*, **107**: 396, 1948.
36. UNGLEY, C. C.—*Lancet*, **1**: 771, 1948.
37. *Idem*—*Brit. M. J.*, **2**: 154, 1948.
38. BETHELL, F. H. *et al.*—*J. Lab. Clin. Med.*, **33**: 1477, 1948.
39. PATEL, J. C.—*Brit. M. J.*, **2**: 934, 1948.
40. DAY, L. A. *et al.*—*Proc. Mayo Clin.*, **24**: 149, 1949.
41. UNGLEY, C. C.—*Brit. M. J.*, **2**: 1370, 1949.
42. UNGLEY, C. C. AND THOMPSON, R. B.—*Ibid.* **1**: 919, 1950.
43. PATEL, J. C. AND KOCHER, B. R.—*Ibid*, **1**: 924, 1950.
44. CHAUDHURI, S.—*Ibid*, **2**: 825, 1951.
45. STOCKMAN,—*Ibid*, **1**: 881, 1893.
46. GOVAN, A. D. T. AND SCOTT, J. M.—*Lancet*, **1**: 14, 1949.
47. SCOTT, J. M. AND GOVAN, A. D. T.—*Brit. M. J.*, **2**: 1083, 1949.
48. SLACK, H. G. B. AND WILKINSON, J. F.—*Ibid*, **1**: 753, 1948.
49. *Idem*—*Lancet*, **1**: 11, 1949.
50. DAVIDSON, L. S. P. AND GIRDWOOD, R. H.—*Brit. M. J.*, **1**: 733, 1948.
51. DAVIDSON, L. S. P., *et al.*—*Ibid*, **1**: 819, 1948.
52. SINCLAIR, R. J. G. AND DUTHIE, J. J. R.—*Lancet*, **2**: 646, 1949.
53. NISSIM, J. A.—*Lancet*, **2**: 49, 1947.
54. MUKHERJEE, C.—*Indian J. M. Sc.*, **5**: 689, 1931.
55. CHAUDHURI, C.—*Indian J. M. Sc.*, **5**: 701, 1951.

sneezing, lacrimation, paresthesiæ, flushing, headache, tachycardia, vomiting, diarrhœa, pleuritic pain and vaso-vagal attacks, reported by earlier observers seem to have been met with much less frequently in recent reports. It has been shown[21] that the intravenous injection of such a trivalent stable iron-complex results in a very slow yield of the elemental iron to the serum proteins. While determining the serum iron, after injection of such a compound, it is usually not possible to differentiate between the iron bound to β_1 globulin and iron still present in the saccharated complex. It seems very likely, however, that owing to the slower release of the elemental iron, the saccharated iron oxide gives the serum proteins more time to transfer iron to the tissues capable of taking it up and making use of it. This saccharated iron complex thus becomes a better and more potent therapeutic agent, as reports also indicate. Further and more extensive studies are necessary to throw more light on many of the obscure points in this problem that still remain to be solved; and more observations from India would be welcome, specially because anæmia in pregnancy is known to vary, in details and in therapeutic response, between countries in tropical and temperate regions.

Copy of a letter from Hon'ble Rajkumari Amrit Kaur, Minister of Health, Govt. of India to Dr. S. C. Sen, General Secretary of Indian Medical Association, Delhi.

MINISTER FOR HEALTH
INDIA

New Delhi,
January 18, 1952.

My dear Dr. Sen,

You are no doubt aware that the existing facilities for Medical Relief and promotion of Public Health in the country are extremely inadequate. Even though I am fully conscious of our urgent needs in the field of Health, I am unable to make sufficient headway because of the financial stringency and inadequacy of Government funds to meet the situation. I am fully convinced that without popular financial support which will supplement governmental efforts, it will not be possible for us to increase health facilities to any desirable extent. It hurts me to see students and children in particular not getting the medical aid and relief that is the due of every youth and child in my State. Also the poor cannot always get medicines that are still very costly and their health suffers. I would like to build up a Welfare Fund that would help the poor, generally speaking, the student world and children, in particular the disabled and blind children. It was with a view to enlist the active sympathy of the people at large that I decided to initiate the Health Seals Sales Campaign in October. The seals have been distributed and are being sold through all Post Offices in the country. They are of one rupee, four annas and one anna denominations. The response so far has not been very encouraging. This is no doubt partly due to the simultaneous inauguration of the T. B. Seals Sales Campaign. As, however, the sale of T. B. Seals will be stopped on the 26th of January, I propose to intensify my campaign for the sale of Health Seals after that date. I would very much appreciate the co-operation of all doctors in the country in making the campaign a success. May I request you, therefore, to use your influence through the Indian Medical Association to induce every doctor in the country to buy or sell Health Seals at least to the value of Rs. 10/-. I shall be grateful if you will kindly give as wide publicity as possible to this proposal through the various branches of the Indian Medical Association as well as through similar bodies and help me to make the compaign a success.

With best wishes,

Yours sincerely,
Sd./- AMRIT KAUR.

DR. S. C. SEN,
Secretary,
Indian Medical Association,

The above letter will speak for itself and the same is commended to the readers of the Journal and members of the Association for their due consideration—Ed., *J. I. M. A.*

CURRENT MEDICAL LITERATURE

Blood Volume in Healthy Indians

Chaudhuri and others (*Indian J. M. Research*, **39**: 237, 1951) write that estimation of blood volume is not merely of physiological interest, but is gradually occupying an important place in clinical medicine. Routine examination for red cells, white cells or hæmoglobin yields valuable information in many diseases, but this is incomplete. It merely indicates the concentration of the various constituents of blood and does not furnish the absolute values. Absolute values are therefore, required for proper interpretation of certain pathological findings, and in order to obtain these, data related to plasma volume or total blood volume are essential. The necessity for considering the blood volume in relation to circulatory dynamics, fluid balance and the composition of blood has now been clearly shown by the physiologists although hardly yet applied in clinical medicine, the main reason being lack of facilities. It is not possible for the average physician to make his own observations of the blood volume in individual patients, but he may be guided by the results of a large number of studies in the laboratory.

The estimation of the blood volume was done by blue-dye method, the technique of which is described briefly. The whole blood and plasma are about 9 and 5 per cent, respectively, of the total body weight. Expressed as volumes, the whole blood is about 83·1 c.c./kg. of body weight and the plasma about 47·7 c.c./kg. The blood volume of an average man of 60 kg. (132 lb.) is, therefore, about 5 liters. Correlation of plasma volume and blood volume with body weight and body surface, though highly significant, is not absolutely predictable. There is little to choose between the two methods but the authors find the correlation with body-surface appears to be better than with body-weight.

Results of plasma and body-volume estimation together with total proteins and hæmoglobins in 50 Indians are given. The mean values are:

Plasma volume—47·7 c.c./kg. and 1,591 c.c./sq.m. body surface.

Blood volume—83·1 c.c./kg. and 2,770 c.c./sq.m. body surface.

Fatal Hypersensitivity to Penicillin

The first recorded case in Great Britain of death due to hypersensitivity to penicillin was investigated by the Newpost District Coroner on April 27, 1951 at the inquest of a baby girl. She had died after penicillin treatment for superficial burns. It was said that only five similar cases had ever been recorded, all in America.

On March 16, 1951 Jane Patricia Sinads, a healthy child aged 14 months, was burnt on the left side of the head and face and on her left hand by spilt frying fat. Her mother at once took her to the Royal Government Hospital. She was seen by the casualty officer, who found a first degree burn involving an area of about 4 in. by 3 in. (10×7·6 cm.) on the left side of her head extending on to her face. Her temperature and pulse were normal. She was not suffering from shock. She had no rash, and her general condition was good. The burn was dressed, she was given penicillin treatment, and sent home, and her mother was told to bring her to hospital next morning for dressing. Next day she was accordingly seen again by the casualty officer, who found her condition unchanged, and the burn was again dressed.

On that evening a doctor was called to the child's home because of swelling round her eyes. As she was fat and had no rash he did not think it advisable to send her to hospital immediately. She was worse next morning, and when taken to Hospital for dressing was at once admitted because of swelling of the face near the burnt surface. This appeared to respond to treatment, but on the evening of the next day, March 19, her temperature rose to 103°F (39·4°C), and on the following day a rash appeared and her temperature continued to rise. She died at 11·30 P.M. on March 21, five days after the penicillin treatment was first given.

At the post-mortem examination carried out next day it was found that the burnt area was clean and was pealing, and the brain was normal. The whole body was covered with a diffuse rash. On opening the chest a quantity of clean yellow fluid gushed out. In each pleural cavity 10-15 oz. (284-426 ml.) of fluid was present, and the lungs were œdematous and somewhat collapsed. The heart was normal, but it was contracted and all the chambers were empty; there was an effusion of about 6 oz. (170 ml.) of clear yellow fluid in the pericardial cavity, which was under tension. Spleen and liver were firm and normal, as were the kidneys, apart from congestion of the medulla and ischæmia of the cortex. The adrenals were congested. The stomach and intestines were distended with gas, and there was an effusion of clean fluid into the peritoneal cavity.

In the opinion of Mr. R. V. Jones who carried out the necropsy, death was caused by cardiac failure due to embarrassment of heart's action by the presence of fluid in the pericardium. This was a part of general outpouring of fluid into the serous cavities of the body which is typical of a sensitivity reaction. The rash and constriction of the smooth muscles of the intestinal sphincters were evidence in support of such a reaction. There was no evidence that any extraneous substance had gained access or that the reaction was caused by the breakdown of the tissue substances in the burnt area, which was clean and healthy. On laboratory examination the fluid effusion showed no micro-organisms and no characteristics of inflammatory exudates. Mr. Jones concluded that since penicillin was the main agent used in treating the burn it was probably penicillin which had caused the sensitivity reaction. Although mild reaction to penicillin such as rashes, pyrexia, and joint effusions had been recorded, he had been able to find no previous records of a fatal reaction.

The Coroner recorded the cause of death as cardiac tamponade due to hypersensitivity reaction to penicillin—*Medico-Legal Correspondent, Brit. M. J.*, **1**: 1269, 1951.

Evaluation of Migraine Therapy

Friedman and von Stroch (*J.A.M.A.*, **145**: 1325, 1951) from analysis of the results obtained by different pharmacological agents and psychotherapy in a large number of cases of migraine observe that the most effective pharmacological agent was 'cafergot' (per tablet ergotamine tartrate, 1 mgm. and caffeine 100 mgm.) given orally with improvement in 86 per cent of cases; parenteral use of ergotamine tartrate and dihydroegotamine brought relief in 80 per cent; suppositories containing caffeine, 'bellafoline' and ergotamine tartrate were efficient in 76 per cent of cases; vasodilators, *e.g.*, nicotinic acid and sympatholytics and

simple analgesics were not very helpful but good results were obtained with the first two in 39 and 29 per cent of cases; 'Demerol' (meperidine hydrochloride U.S.P.) brought relief in 67 per cent and codeine in 57 per cent cases. Attempts to prevent entirely the occurrence of headache were not highly successful but psychotherapy proved effective in 66 per cent and this method also maintained the improvement obtained. Intravenous and subcutaneous use of histamine were effective only in 36 per cent of cases. In conclusion the authors write that the treatment of migraine is a complex individualised procedure that best results have been obtained with the use of a compound containing ergotamine and caffeine. Prevention is best accomplished with psychotherapy which consisted of 'analytically oriented interviews by trained psychiatrists, without any attempt at formal analysis.'

Treatment of Pruritus

Rook (*Practitioner*, 167: 191, 1951) in dealing with treatment of the condition writes that wherever possible, treatment should be directed at removing the cause of the pruritus. However, even when this can be achieved, symptomatic treatment is often urgently necessary when the cause is irremediable or when the pruritus is idiopathic. This will involve an attempt to suppress or counteract those factors increasing local irritabilities and to raise the threshold for pruritus at thalamic and higher level.

For securing sound sleep specially in the exhausted patient who is perpetually aggravating his condition by scratching, aspirin and antipyrin may be sufficient in milder cases but bromide is the most helpful drug and may be combined with phenobarbitones. The antihistamines though of value in pruritic dermatoses of allergic origin are less effective in many cases without skin lesions; as occasional cases are relieved these drugs deserve a trial. The use of opium is unjustifiable except in malignant diseases where papaverine hydrochloride, grain one and a half orally and 1 grain intravenously is often effective.

For the part played by autonomic nervous system in modifying the peripheral threshold to pruritus atropine derivatives and the combination of tincture of belladonna, 5 to 10 minims with ½ to 1 grain phenobarbitone sodium have been used with benefit. Ergotamine tartrate has been observed to be of particular value in the pruritus of jaundice but should be used with caution as serious sequelæ have been reported. Injections of calcium gluconate are also of value in pruritus of jaundice and occasionally in other forms of pruritus. Nicotinic acid, also a vasodilator, is sometimes helpful.

In pruritus of Hodgkin's disease and leukæmias, Fowler's solution has been found effective and can be employed.

Autohæmotherapy deserves a trial specially in idiopathic pruritus.

In senile pruritus which is probably of endocrine origin it has been found that testosterone propionate is very effective by subcutaneous injection, 10 mgm. given weekly at first, the interval between injections being gradually increased.

In some cases daily suberythema dose of ultra-violet light gives a great relief when other measures have failed.

Local Measures—All factors tending to increase the local irritability of the skin must be carefully eliminated. Local applications act either by substituting the sensation of cold for that of itching or by a local anæsthetic effect or merely as protection or as emollients. Phenol is still the main standby; 0·5 to 1 per cent may be added to calamine lotion. When the skin is dry an oily base is preferable and phenol 1 per cent or solution of coal tar 5 to 10 per cent may be incorporated in only calamine lotion. But phenol even in low concentration should not be applied to too extensive an area or for too long a period, particularly in children. An application suitable for an extensive area is: Solution of coal tar—1, solution of aluminium acetate—10, arachis oil—10, ointment of wood alcohols and water—100. In senile pruritus, when the regular use of a local application may be necessary for a prolonged period a simple emollient such as glycerin of starch B. P. and salicylic acid ointment in equal or glycerin of starch B. P. 1 part and arachis oil 3 parts may be prefered.

Bronchiectasis Treated with Chloramphenicol

Wynn-Williams and Moyes (*Edinburgh M. J.*, 58: 503, 1951) maintain that the results of treatment of bronchiectasis with penicillin with or without streptomycin have been found less favourable in their hands than those achieved by other investigators though there was a significant reduction of sputum (61 per cent). Chloramphenicol being an antibiotic with a wide range of antimicrobial activity which has no serious toxic effects and which can be taken by mouth was selected by the authors to avoid the disadvantages caused by the penicillin treatment necessitating admission to hospital and interruption of the normal life. Chloramphenicol caused a greater reduction of sputum (83 per cent) both when compared with the overall past results and also by direct comparison in 6 patients. Moreover, this improvement was obtained in out-patients who lived normal lives. It was given in 15 patients with proven bronchiectasis all of whom had purulent sputum and it was given on an out-patient basis to 12 with an average reduction in sputum in 83 per cent. The authors maintain that although the immediate results were so good it is likely that the sputum will gradually return in amount as has been found to happen after penicillin. Chloramphenicol is not claimed to be a drug which will remove permanently the infection in the dilated bronchi but if the results so far obtained can be repeated a valuable antibiotic has been added to our armamentarium in tackling such conditions as bronchiectasis.

Positioning for Cholecystography

An editorial in Gastroenterology (*Gastroenterol*, 18: 321, 1951) draws attention to work that has been done at the Mayo Clinic on the best position in which to place the patient for cholecystography so as to obtain a clear picture of the gall-bladder. As a result of this investigation it has been found that this position is an anteroposterior view with the patient lying on his right side. This permits the gall-bladder 'to gravitate somewhat away from the bowel,' and therefore throws it clear of gas shadows. It also gives a better view of the bile ducts. It is said to have the further advantage that 'gallstones that cannot be identified in films taken in the ordinary position are plainly visible in a layer perhaps underlying the dye.' The editorial concludes: 'This technique is so satisfactory that it should perhaps be used routinely throughout the world. With it, the use of pitressin is rarely needed.'—(*Practitioner*, 167: 460, 1951).

The Painful Back

Bagnall (*Candian M. A. J.*, 64: 107, 1951 Ref. *Practitioner*, 167: 91, 1951) point out that the pain in the back may be due to physical stress from local trauma or general

exhaustion; to infective stress from a site distant from the spine such as a dental abscess, localized to the spine such as Pott's disease, or systemic, as in malaria; or to psychic stress, the most frequent precipitating cause of backache. As an illustration of the important part played by psychic stress in the etiology of backache, the author quotes the fact that some patients with osteoarthritis of the spine have a great deal of discomfort, whereas others with an equal amount of damage as shown by x-rays have little or no pain. The importance of a 'total' therapeutic approach to such cases is, therefore, stressed. 'In most patients with painful backs, psychotherapy must be more practical than intellectual. They get better by feeling better.' The most important therapeutic measures are physical therapy and life adjustment: with a medicinal background of non-narcotic anodynes and mild sedation physical therapy consists in exercises to build up the spinal musculature. For life adjustment the stresses previously at work and the physical and emotional equipment of the patient must be thoroughly understood as a basis for economic rehabilitation. Referring to therapeutic measures the author draws attention to the spectacular results of cortisone or ACTH in rheumatoid spondylitis and states: .....used in conjunction with exercise therapy and intelligent life adjustment, ACTH and cortisone probably offer far more hope of relief in spondylitis, and perhaps in other forms of spinal disease, than has ever been available previously.

Expectant Treatment of Perforated Peptic Ulcer

Beattie (*Brit. M. J.*, 1: 992, 1951) writes that expectant treatment was practised in 40 unselected patients with acute perforated peptic ulcer, of whom 32 had duodenal ulcers, 7 had gastric ulcers, and 1 had carcinoma of the stomach. Treatment consisted of immediate aspiration of the stomach contents, continuous gastric suction, repeated injection of morphine, and intravenous infusion. The patients were kept under constant control during the first 48 hours of expectant treatment, and laparotomy was performed if there was no obvious clinical improvement. Four patients died, and the treatment failed in five patients. Thirty-one of the 32 patients with perforated duodenal ulcer recovered under expectant treatment, but only one out of four patients with anterior perforations of the stomach survived. In 13 of the 36 surviving patients either localized pneumonitis or basal collapse developed. The incidence of chest complications thus was approximately the same as that following surgical treatment of perforated peptic ulcer. As the result of these experiences the author has now abandoned the expectant method of treatment in favour of early laparotomy in every case. If the perforation is found to have sealed adequately either by adhesion to the liver or by means of an omental plug, the abdomen is closed again with no further surgical intervention, and conservative treatment is then instituted. Actual operative closure of the perforation is normally reserved for cases in which there is apparently no spontaneous sealing, though it is done routinely in every instance of anterior gastric ulcer.

Emergency Medical Treatment of Bleeding Oesophageal Varices

Lorant (*Gastroenterol.*, 16: 716, 1950) writes that it is important to realize that bleeding from œsophageal varices is of the venous type, whereas the ulcers of the gastrointestinal tract bleed either from the arteries or from the capillaries. This may explain why bed rest, administration of vitamin K and blood transfusions prove effective in bleeding ulcers but not in œsophageal varices. After explaining the circulatory mechanisms involved in the production of œsophageal varices, the author shows that the reversal of the direction of gravitation will diminish the bleeding from the varices. To reverse the force of gravitation the following methods are suggested: (1) Simple elevation of the foot of the bed by 10 inches. If this elevation does not give a satisfactory result, a higher elevation should be tried. (2) With the patient in prone position, 15 to 20 inches elevation of the pelvis. The author had the opportunity of applying these principles in patients with bleeding œsophageal varices in whom treatment with isotonic sodium chloride solution, dextrose, protein hydrolysate (amigen), vitamin K and blood transfusions had not produced the desired results. In the first patient the effect was dramatic: three hours after elevation, the patient vomited 200 c.c. of dark blood clots and following that the bleeding stopped completely and did not recur in the next 10 days. There was no need to study the effect of other methods on this patient. Encouraged by the good results, the author tried the postural treatment in five more patients with bleeding œsophageal varices. The general impression was that following postural treatment the bleeding stopped immediately in five of the six patients. Five patients survived, and one died.

Ocular Manifestations of Multiple Sclerosis

Yaskin and others (*Am. J. Oph.*, 34: 687, 1951) in reporting on the ocular manifestations of 100 consecutive cases of multiple sclerosis observe that it was found that 73 had as their earliest manifestations predominantly general neurological symptoms and that 27 had only ocular symptoms, which included blurred, double, or jumpy vision, difficulty in focusing, and sudden or gradual loss of vision. The time interval between the initial ocular symptoms and other evidences of multiple sclerosis was known in 20 of the 27 patients in whom the eye symptoms were the first manifestation. In 11 the interval was a year or less, in five about two years, and in four from 10 to 14 years. Hospital studies on the 100 patients with multiple sclerosis revealed that 56 had ocular manifestations. Fifty-one had changes in the optic nerve disks; retrobulbar neuritis was present in 31, and in 14 of these it was the initial sign of the disease. The ocular manifestations of multiple sclerosis should be carefully evaluated for the purposes of an early diagnosis, but these should not be too strongly relied on as pathognomonic of multiple sclerosis. It is particularly desirable that conditions stimulating multiple sclerosis be diagnosed early; brain tumors, vascular disturbances, arachnoiditis, and other inflammatory and degenerative diseases may begin with ocular symptoms, and, since these are more or less amenable to treatment, they should be recognized before the patient becomes hopelessly blind or otherwise disabled.

Use of Cortisone in Diseases of the Eye

Lavery and others (*Brit. M. J.*, 1: 1285, 1951) made a clinical investigation on the use of cortisone in diseases of the eye. It was used in the form of cortisone acetate ointment (25 mgm. per gm.) and a 2·5 per cent suspension in saline (25 mgm. per ml.) for instillation both being bland when administered into the conjunctival sac. Subconjunctival injection given every other day followed by instillation of cortisone drops every 2 hours during the day and insertion of the ointment last thing at night was the method of choice. The subconjunctival injections were entirely painless if local

analgesia had been previously produced by the application of a pledget of cotton wool soaked in 2 per cent butacaine sulphate at the site of the intended injection. A survey of 83 cases shows that 27 were much improved, 22 were moderately improved and 34 were unimproved by local cortisone treatment. Dramatic results were obtained in eight out of nine cases of interstitial keratitis. Iridocyclitis cases also improved rapidly. Treatment of two cases of sympathetic ophthalmia with systemic cortisone was successful.

It is concluded that cortisone is very valuable in the control of allergic reactions in the eye but has no effect on any underlying disease which may be the basic condition.

E. C. G. in Pregnancy and Puerperium

Zatuchni (*Am. Heart J.*, 42: 11, 1951) gives in the following lines the summary of his observations:

Ninety-eight electrocardiograms of 25 normal patients with uncomplicated pregnancy, delivery, and post-partum course were studied. Electrocardiograms were taken antepartum, within 24 hours following delivery, and during the early puerperium.

With advancing pregnancy, the electrocardiographic position of the heart either remained the same or became less vertical. Following delivery, it either remained the same or became more vertical. A horizontal position was not observed during pregnancy; however, it was present in 1 patient after delivery.

The mean electrical axis shifted to the left with advancing pregnancy until the latter part of the third trimester, when it usually shifted toward the right. The shift to the right continued after delivery.

The direction of the mean electrical axis of QRS may change even though the electrocardiographic position of the heart remains the same.

The major positional change of the heart during pregnancy and the puerperium is rotation around its anteroposterior axis.

There were no electrocardiographic manifestations of ventricular hypertrophy or "strain."

After delivery, changes in the amplitude of the T wave, due principally to changes in the magnitude of the mean T vector rather than in its direction, were observed.

Renal Failure Following Accidental Haemorrhage of Pregnancy

Tennent and Starritt (*Glasgow M. J.*, 32: 85, 1951, Ref. *J. A. M. A.*, 146: 1450, 1951) from a study of 17 cases of accidental retroplacental hæmorrhage of pregnancy observe: All infants were stillborn. Renal failure was demonstrated in eight of the women. The eight cases were grouped according to Van Slyke's classification of renal lesions: (1) irreversible damage to nephrons, (2) reversible damage, or (3) reduced function without damage. Only one case came into the classification of irreversible damage to nephrons. This woman died on the 11th day. Autopsy revealed typical bilateral symmetrical cortical necrosis of the kidneys. Three cases came into the category of reversible damage to nephrons. They all showed oliguria and nitrogen retention. Normal output of urine returned within 14 days in each case, but, after apparent clinical recovery had taken place, each showed deficient urea-concentrating power. Four cases fall into the classification of reduced function without damage; they showed evidence of nitrogen retention without diminution in the urinary output. All these patients demonstrated normal urea-concentrating power before dismissal. It may be concluded from these eight cases that the degree of renal failure varies directly with the severity of shock and anæmia. Renal ischæmia occurs during the shock phase, and anæmia predisposes to renal anoxia in the puerperium. Treatment during the accidental hæmorrhage should be directed to minimizing of the severity and duration of the shock phase and thus renal ischæmia. The authors feel that this is best done by blood transfusion. The judicious use of puncture of the membranes to initiate labor in certain cases may help to shorten the shock phase.

Obstetrical Consideration in Essential Hypertension

Nordenstrahl (*Nordisk Med.* Stockholm, 45: 433, 1951, Ref. *J. A. M. A.*, 144: 1268, 1951) says that in essential hypertension it is sometimes difficult during pregnancy to differentiate between hypertension, hypertension with superimposed toxicosis, and early simple toxicosis. The effect of hypertension in pregnancy is mainly threefold; intrauterine death is frequent, the infant's weight is less than the weight corresponding to the duration of the pregnancy, and there is definite danger of toxicosis. With blood pressure of 160/100 or more during the first half of pregnancy, renal function tests should be made; if filtration is reduced the pregnancy can be allowed to continue only under the strictest control. Blood pressure increase to 150 or 160 during pregnancy requires only weekly observation from the sixth month on. When the blood pressure is over 170/95 during the later part of pregnancy the critical period for fœtal death is between the fifth and fourth week before parturition. For delivery of a living child birth should be induced by rupture of the membrane in multiparas and cesarian section should be done in older primiparas. If bed rest and other treatment can bring the blood pressure down to 170/100, natural delivery may be awaited, but hospital care during the last six weeks is necessary. Prophylactic vitamin C and vitamin D medication in all cases of essential hypertension is believed to be important if given in sufficiently large doses to reduce the fragility of the blood vessels and the tendency to premature separation of the placenta.

Vitamin A Poisoning

Gribetz (*Pediatrics*, 7: 372, 1951) reports on the occurrence of hypervitaminosis A in two children, a boy 2½ years and a girl 17 months. A survey of the literature revealed records of only 14 cases, all in infants and children, with symptoms of overdosage with vitamin A. The author's first patient was admitted to the hospital because of irritability, failure to walk, and rœntgenologic evidence of cortical thickening of bone suggesting scurvy or leukæmia. He also had lesions around the mouth resembling those of vitamin B complex deficiency. A survey of the child's vitamin status in general was undertaken and an elevated fasting vitamin A level of 837γ per 100 c.c. was found. History revealed excessive vitamin A intake. The fasting vitamin A level two days later was 695γ per 100 c.c., of which 67·3 per cent was in the alcoholic form. This elevated level of alcoholic vitamin A, probably denoting large stores of vitamin A in the liver, appears to be a better index of hypervitaminosis A than the total vitamin A level. In addition, evidence has been presented that the toxic factor in hypervitaminosis A is the persistently elevated plasma vitamin A level. The

authors' second patient had a history of excess vitamin A intake and the characteristic clinical and rœntgenographic findings. The symptoms disappeared after cessation of high vitamin A intake. It is suggested that excess intake of vitamin A causes saturation of the tissues, which leads to pathological changes involving the epiphyseal and appositional bone growth, which consist of increased density of the epiphyseal lines and cortical thickening. Cortical thickening apparently causes the tenderness of the extremities that was seen clinically. It cannot be emphasized too strongly that excess vitamin intake may be as dangerous as a deficient intake.

Vitamin D Intoxication

Chaplin and others (*Am. J. Med. Sc.*, 221: 369, 1951) in reviewing the literature containing reports of 111 cases of hypervitaminosis D observe: The syndrome consists of weakness, fatigue, and weight loss in general; nausea, vomiting, diarrhœa, abdominal cramps; headache, paræsthesia, and vertigo; depression, mild psychosis, and stupor; normocytic, normochromic anæmia; albumin, red blood cells, casts in the urine, with progressive impairment in concentrating ability; frequency and nocturia; band keratitis; elevated serum calcium and phosphorus, with normal or slightly elevated alkaline phosphatase; progressive nitrogen retention; diffuse demineralization of the bones in advanced cases, and periarticular soft tissue calcification. Depending on the severity of intoxication, all or only a few of the above described findings will be present, as indicated in the authors' seven additional cases, which are described in some detail. Six of these patients exhibited band keratitis, a lesion commonly associated with disturbed calcium metabolism. The two most serious of the seven cases were remarkable for the demonstration of calcium-containing cysts, which were located largely in the periarticular areas and in the vicinity of the bursæ. These cysts were fluctuant, did not transilluminate, and varied from 1·5 to 8 cm. in diameter. The calcium-phosphorus ratio of the sediments centrifuged from the aspirated fluid of the cysts was more than twice that present in bone. Treatment of the patients consisted of cessation of vitamin D intake, a strict low calcium diet, avoidance of undue exposure to sunlight, avoidance of alkali, maximum mobilization of the patient, and sufficient fluid intake for a daily urinary output of at least 2,000 c.c. Some of the patients were given diethylstilbestrol. Vitamin D is a potentially dangerous drug and should be used only in diseases in which there is a reasonable rationale for usage. If it is used in massive doses, careful follow-up is obligatory for early detection of signs of intoxication.

Tetanus Immunization

Bigler (*Am. J. Diseases Child.*, 81: 226, 1951) writes that there have been many reports on the immediate effectiveness of immunization against tetanus with tetanus toxoid, but there have been few reports on longer term immunity levels. The observations reported in the series under consideration were made on 300 infants and children, most of whom were immunized between 1938 and 1940. During the intervening years, 1,363 titrations of the blood serum for tetanus antitoxin were made on 262 of these children. The results of these titrations indicate that a primary or basic immunization can be obtained with either two or three injections of tetanus toxoid. When two injections are used for basic immunization, protective levels are not always attained and booster injection should always be given after an injury, no matter how short the interval. Detectable amounts of tetanus antitoxin were present in the blood serum of all immunized children tested up to 10 years later during the study. Protective levels of antitoxin were present after booster injections given up to 10 years after immunization. Protective levels were obtained with each of as many as five booster injections. The response to the booster injections was rapid, occurring within the first seven days. The greater the number of injections, the longer the protective levels were maintained. Until there are further reports on antitoxin levels over long intervals, although apparently protective levels are present, it would seem advisable to give a booster injection to an immunized person at the time of an injury from which tetanus might develop.

Prevention of Whooping Cough by Vaccination

The following is the summary of the Medical Research Council Investigation on prevention of whooping cough by vaccination:

Controlled trials were made to assess the prophylactic value of pertussis vaccine in children. Those between the ages of 6 and 18 months whose parents consented to take part in the study were divided by the method of random sampling into two groups of equal size. The groups proved to be strikingly similar in the average age of the trial children, the average number of children in the families, and the average duration of observation. The close similarity of the groups was also evident from a comparative history of breast-feeding, infectious diseases other than pertussis, immunization against diphtheria, and vaccination against small pox.

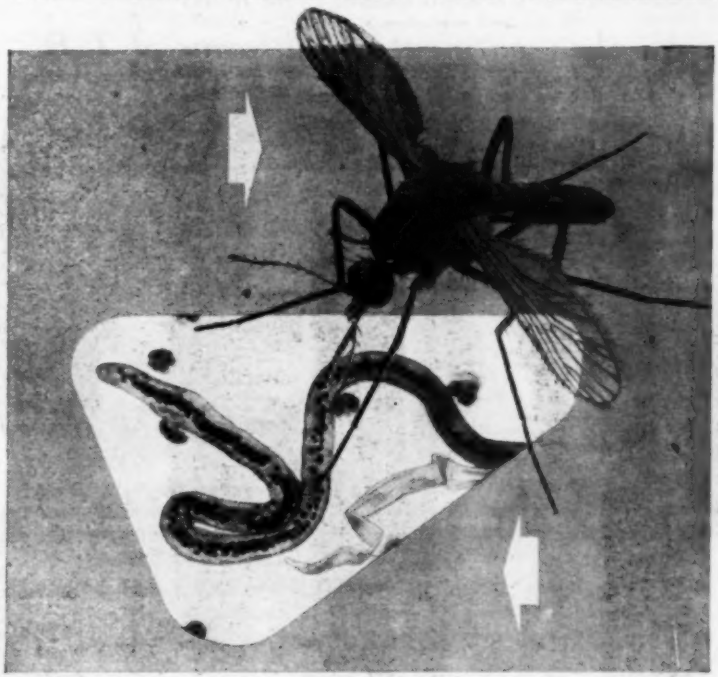
The children in one group (referred to as the vaccinated group) were inoculated with pertussis vaccine and those in the other (referred to as the unvaccinated group) with "anti-catarrhal" vaccine containing no H. pertussis. Each child was visited at frequent intervals for a period of two to three years by a nurse-investigator. Neither parents nor observers knew to which group a child had been allocated.

Five batches of pertussis vaccine from three manufacturers—Parke Davis & Co., of Detroit, the Michigan Department of Health, and Glaxo Laboratories, Ltd.,—were tested. Ten separate field trials were made in five different areas. In all, 7,558 children were inoculated and followed up—3,801 in the vaccinated and 3,757 in the unvaccinated group. With only a few exceptions there were no severe local or general reactions after inoculation. None of the children had convulsions and in none did poliomyelitis develop within two months of inoculation.

In all the trials, 149 vaccinated and 687 unvaccinated children developed pertussis. The corresponding attack rates per 1,000 child-months of observation were 1·45 and 6·72, giving a reduction in the incidence of the disease of 78 per cent. Among children exposed to pertussis in their own homes the attack rates were 18·2 per cent in the vaccinated and 87·3 per cent in the unvaccinated groups. The cases that occurred in the vaccinated were on the average less severe and of shorter duration than those in the unvaccinated children. During the two to three-year periods of observation there was no evidence of a waning in the degree of protection afforded by the pertussis vaccines.

Swabs were taken from 96·4 per cent of all clinical cases, and in 59·8 per cent a bacteriological confirmation was obtained.

THE **ORAL** TREATMENT FOR **FILARIASIS**



'Banocide,' a new non-metallic compound, which is administered orally, is markedly active against filariæ, especially *Wuchereria bancrofti* and *Onchocerca volvulus*. It is particularly effective in killing microfilariæ and even in moderate dosage causes their rapid disappearance. In some cases of bancroftian infection which have been carefully followed up, the blood has been found negative a year after treatment ceased, an observation which suggests that the adult worms have also been killed. The toxicity of the compound is low and its stability is unaffected by hot climates. 'Banocide' is issued as compressed products of 50 mgm. in containers of 20, 100, 1000 and 5000.

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Diethylcarbamazine (1-diethylcarbamyl-4-methylpiperazine citrate)

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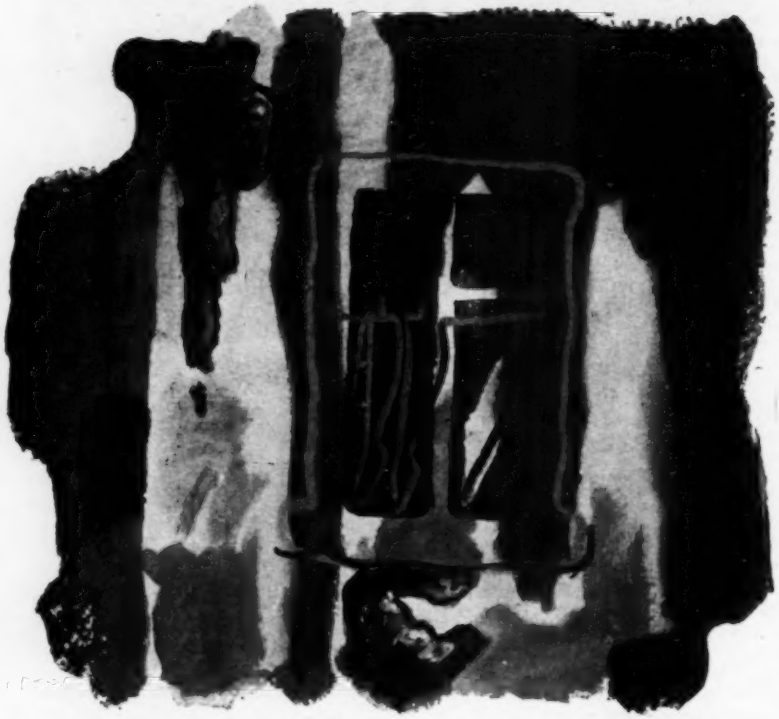

Packings : Stearic acid enterocoated granules 65% 125 gm. and 450 gm., enterocoated pills 0.3 gm. 500 and 1000, tablets 0.5 gm. 100, 250 and 1000.

NEW : PAS-CILAG crystals for parenteral treatment of T. B.

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Each batch of vaccine gave substantial protection but the two batches supplied by the Michigan Department of Health gave a considerably greater degree of protection than the others.

Vaccines prepared in this country according to the method used by the Michigan Department of Health are now being tested in similar fields trials. An investigation is also being made in which the immunizing properties of vaccines as indicated by laboratory tests are being compared with their prophylactic value in the field.—*Brit. M. J.*, 1: 1463, 1951.

Potassium Chloride in Pyloric Stenosis in Infants

Master and others (*Am. J. M. Sc.*, 221: 21, 1951) write that during the preoperative period, six infants, in the second to eleventh week of life, with repeated vomiting due to pyloric stenosis, were given intravenously a 35 milliequivalents per liter solution of potassium chloride in 5 per cent dextrose, resulting in intakes of potassium as high as 46 milliequivalents. Four of the six infants received plasma or whole blood as well. The remainder of the intake during the preoperative period was limited to parenterally administered solutions of dextrose, 5 or 10 per cent, and sodium chloride, 0·9 per cent. Measurement of external and internal exchanges following these injections revealed a retention of administered potassium, chiefly in the cells, and of sodium and chloride in the extracellular fluid. These changes represent a restoration of body fluid composition to normal, and their acceleration is highly desirable. The administration of potassium chloride solution permits the replenishment of extracellular and intracellular potassium and provides the chloride ion in excess of sodium which is desirable in view of the greater losses of chloride than of sodium in gastric secretions. The authors recommend slow administration of a relatively dilute solution of potassium following the establishment of adequate renal function. This precaution is dictated by the known toxic effects of increased extracellular concentrations of potassium, which include electrocardiographic alterations and possible skin and neurologic manifestations. There are several premixed solutions that take many of these factors into account and therefore meet the needs in a good many clinical situations. Individual prescriptions that permit control of the sequence as well as the quantity of replacement therapy are to be preferred.

CURRENT TOPIC

THE CONFERENCE THAT DID NOT MEET

K. A. SHAH, M.B., B.S.,
Ahmedabad

ADDRESS BY THE CHAIRMAN OF THE RECEPTION COMMITTEE

Sisters and Brothers,

This is the first time that our Conference meets in a village. We are all proud that that honour has been given to our village. Our village is probably as old as India, but we have no recorded history which we can cite to you, in praise of our ancient glory. We have selected this place simply because we want you all to come in direct contact with our common people and see how they live, what they eat and drink and what diseases they suffer from. We want to learn from your experience and wisdom.

My Committee is conscious of the fact that you are all used to a civilized way of life, and that the arrangements we have made for your stay here may have appeared primitive to you and may have inconvenienced many of you. We have not been able to provide for you, water taps or the luxury of bathrooms; but we hope that the morning bath in the cold water of our small river has refreshed you, and the exercise of washing your own clothes has whetted your appetite. We have failed to provide you with rich dishes but we have tried our best to serve you with nutritious and wholesome food. The whey that was given to you with your breakfast was hand-churned and contained all the proteins and calcium and vitamins of fresh milk. The chapatties were made from whole wheat and the wheat were hand-milled; the vegetables were grown in our own village. We have been unable to illuminate this session with electricity but we have chosen the bright half of the month for our Conference, and we hope that when we meet tonight you will enjoy the delightfully bright moonlight filtered through our smokeless sky. Finally, on behalf of you all and on behalf of the Reception Committee, I have to thank the people of this village who have voluntarily made all the arrangements for your hospitality and spared my Committee (*i.e.*, doctor-members of the Committee) all the expenses.

ADDRESS BY THE PRESIDENT OF THE CONFERENCE

Comrades,

I am grateful to you for electing an old and obscure colleague like myself, practising in a village, to be your president. It was my intention to make no speech for I have come here to learn and not to deliver an address. But custom demands that the President should make a speech and I am here, in obedience to that custom. All the same, our usual practice of printing the president's address does not appeal to me, for it involves unnecessary expenses. I have therefore no printed address to read before you. I will put my ideas before you briefly, and I hope, without boring you.

Modern medical science is a vast ocean of knowledge. It is so vast that it has become impossible for any single individual to become proficient in the whole of it. A person contacting this unlimited science must needs become humble. Can we honestly say that we have learnt that humility? The little knowledge we have acquired, has so intoxicated us that we have become dogmatic and we have started to assert that our science is perfect, though it is not exactly so. Not only do we claim perfection for our own system but we disparage other systems. Please do not run away with the idea that I am belittling our own science. Far from it, I am quite sure that it is our modern medical science which will win the ultimate approval of our people and our government, for it is more scientific than ayurveda, or homœpathy or any other system. More scientific because it is more exact, quantitative and not merely qualitative.

But let us also recognize our own limitations. If you or I have a headache here, our first instinct will be to search for a chemist's shop, or we will try to borrow aspirin from a friend; but not one of us has the knowledge to enable him to cure his headache, by a homely remedy available at the local grocer's shop or by a herb growing on the outskirts of this village. If there is an epidemic of cholera or plague overnight (which God forbid), we will have to send frantic telegrams to Bombay or Calcutta for a supply of vaccine or

drugs like sulphaguanidine and streptomycin. The point is that our science makes us not self-reliant but dependent on others. We have almost become the agents of big manufacturers. I am sure you are all familiar with the prescriptions of consultants of cities like Bombay and Calcutta. An average prescription consists of a mixture, one or two injections, one or two tablets, and an elixir, most of these being patent preparations. And patent medicines have a fashion! What we prescribed in 1930 was discarded in 1940 and we no longer recommend now what we prescribed in 1940! It can be argued that this is a sign of progress. But let us pause for a while to consider this point. If a company A has put on the market some preparation which is successful, company B has no interest in manufacturing the same. They will make a slightly different product, and put it on the market and will carry on intense propaganda to establish the superiority of their product. Thus the manufacturers put different products on the market and flood us with propagandist literature—nicely printed pamphlets and even scientific brochures—and we fall into their trap. Please do not tell me that many firms are reputable ones; they are honest; they encourage and sometimes lead research. I admit all that. But isn't this the very reason why their preparations are so costly? And I hope no one believes that these concerns are run for philanthropy. They foster only that research and practise that honesty which is to their advantage. If per adventure a scientist discovers some chemical which when taken in drinking water prevents all diseases, these manufacturers would jointly buy up the patent of that chemical and *destroy that formula*. They would neither produce this stuff nor let any one do it. I have no doubt about this in my mind. But of course this is my personal opinion, and there is room for a different opinion.

What matters is that our treatment is very expensive. We must make it as cheap as we can. So long as we cannot do this, we shall have to let ayurveda and other systems flourish. We will have to learn the cheap and homely remedies of ayurveda, experiment with them and accept the theory of ayurveda. As far as theory is concerned, that of homœopathy is also equally difficult to swallow. But if you read homœopathic books, you will be surprised to read the brilliant results which the homœopaths achieve. No doubt when an exponent is writing about his own pet system he is likely to exaggerate matters—more so if he is writing for a lay public. But even after granting this the fact remains that some of the cures made by homœopaths are simply marvellous. It would be foolish to think that all these reports are false or that the authors are liars. Further, if doctors like the late Mahendralal Sarkar who was a brilliant student of modern medicine give up this system for homœopathy, surely homœopathy cannot be quackery. You will be surprised to know that many an allopath has given up his system in favour of homœopathy but not a single homœopath has ever been converted to allopathy.

But let me bore you no longer. Let me in conclusion urge upon you the necessity of passing resolutions which will benefit our people as a whole. We have had enough of recommendations made and advice tendered to Government. Let us now think of our duties and not our rights. If I had my way, I would pass only one resolution and spend the whole year in implementing that. But if this is not possible, let us pass as few resolutions as possible and concentrate all our efforts in implementing them.

RESOLUTIONS

(1) Whereas it has been brought to the notice of this Conference that certain unethical practices—like giving of false certificates, filling incorrect insurance reports, giving unnecessary injections to patients—are current among some of its members this Conference sorrowfully and solemnly vows that no member shall ever repeat this offence in future and any member found guilty of such malpractice shall be excommunicated.

(2) If our newly-won freedom is to be fostered and our Government run efficiently, it is absolutely necessary that every citizen should pay all the taxes due to him. This Conference therefore urges upon all medical men to fill correct income-tax returns and to insist on paying the Sales Tax wherever it is levied, and also to demand that the chemist or shopkeeper shall show that Sales Tax in his bills.

(3) Whereas the *per capita* income in our country is round about Rs. 250/- per annum, this Conference resolves that:—(*a*) no medical man in government or private service, whether in a hospital or a college shall demand more than six hundred rupees per month as his salary, and (*b*) shall insist that the lowest-paid servant under him shall not get anything less than one tenth of his (doctor's) salary, *i.e.*, sixty rupees.

(4) Whereas there is no fixed standard of fees in our profession, and the prevailing rates are exorbitant, it is hereby resolved that:—(*a*) the fees for a consultant examining patients at his consulting rooms shall be ten rupees, and fifteen rupees for visiting the patient at the latter's residence. The fees for laboratory work and X-ray shall be extra, but in no circumstances shall such fees exceed rupees fifty. Where any examination is essential for the diagnosis of a case (*e.g.*, that of urine in glycosuria and blood in tropical eosinophilia), the physician shall not charge any extra fees. If the patient, however, demands any kind of laboratory investigation the physician shall be within his rights to levy extra fees. (*b*) The visit fees for doctors running their own dispensaries shall be five rupees, and they shall examine patients free at these dispensaries. The patient, however, shall have no voice in the necessity or method of such examination, and shall have to pay rupees three if he insists on examination, as and when he likes; (*c*) For the injection that these general practitioners administer, a charge of rupees three shall be made irrespective of the fact whether the injection is given subcutaneously, intramuscularly, or intravenously, and whether it is given at the patient's own house or the dispensary. This does not, however, abrogate the physician's right to ask his patients to buy injectable drugs needed for treatment.

(5) This conference is of the firm opinion that the medium of instruction in medical colleges must be the provincial language, but in order to maintain a uniform standard all over the country, it is necessary that there should be one terminology accepted by all. The Conference therefore appoints a Committee of the following members to work out such a terminology and instructs them to evolve new words from Samskrta wherever necessary without fear that Samskrta words will break our jaws. If words like "encephalitis lethargica" and "ophthalmia neonatorum" have not broken our jaws, there is little fear that Samskrta words (*e.g.*, নবজাত শৈশবাক্ষি) will break the jaws of our children.

(6) For the guidance of future conferences, it is resolved that at no session of the Conference more than five resolutions shall be passed during any one year.

NOTES AND NEWS

DR. A. D. MUKHARJI ELECTED TO WEST BENGAL LEGISLATIVE ASSEMBLY

Dr. A. D. Mukharji, the editor of our Journal has been declared elected to the West Bengal Legislative Assembly from Barasat constituency of 24 Parganas. He secured 18,276 votes out of 21,346 polled *i.e.*, 85 per cent of the total votes polled, were cast in his favour. It is a unique success, like of which very few candidates could achieve during the last general election.

RAPTAKOS MEDICAL RESEARCH BOARD FELLOWSHIPS, 1952

"Raptakos Medical Research Board" Fellowships, for the year 1952 have been awarded to the following candidates for research work in subjects mentioned against their respective names:

(1) Mr. D. V. Rege, University Dept. of Chemical Technology, Bombay: Role of Folic acid and Vitamin B_{12} in nucleic acid metabolism.

(2) Miss Vatsala N. Thakur, Tata Memorial Hospital, Bombay: Isolation of Carcinogenic substances from tobaccos used for chewing in India.

(3) Mr. M. Bhimasena Rao, Indian Dairy Research Institute, Bangalore: Milk diets in relation to Infantile Cirrhosis.

(4) Dr. K. Gopalachari, Government General Hospital, Madras: Hypertension.

ENDOWMENT LECTURESHIP IN PEDIATRICS

Dr. A. V. S. Sarma, Honorary Physician and Pediatrician, Government Hospital, Royapettah Madras, and his wife have endowed Rs. 5,000/- to the Andhra University as 'Dr. A. V. S. Sarma and Srimathi Lalithamba endowment Lectureship' for the promotion of Pediatrics.

Dr. A. V. S. Sarma has further endowed a sum of Rs. 500/- for a prize in Pediatrics in the Stanley Medical College, Madras, in the name of his parents—"Akkaraju Seetharamiah-Ramamma Garu prize for Pediatrics."

INTERNATIONAL CERTIFICATES OF INOCULATION AND VACCINATION

It has been reported that a number of misunderstandings have occurred concerning the date of issue, and hence, the duration of the period of validity of International Certificates of Inoculation and Vaccination due to differences in national practice of recording the date. For example, 10 August, 1951, may be written in the following manner:—

10 Aug. 1951—Aug. 10th 1951—10-8-51

In order to reduce to the minimum the number of such misunderstandings it is suggested that when completing the International Certificates of Inoculation or Vaccination in English or in French, the following method of recording the date should be adopted. The date should be written in Arabic numerals and should appear first; the month should be written in Roman numerals and should appear second; the year should be written in Arabic numerals and should appear last.

In the example quoted above, the date would appear as "10. VIII, 1951."

JOINT FAO/WHO EXPERT COMMITTEE ON NUTRITION, 1951

Hypervitaminosis D—During the last few years an alarming number of cases of toxity due to excessively large doses of vitamin D have been reported in infants and children from a number of countries. A recent publication (R. Deore and H. E. Brissaud, Annales de Medecine, 50, 1949, p. 418) reviews 254 cases of intoxication due to excessively large doses of vitamin D_2. In this series there were 11 deaths and in many others there was irreparable damage to the kidneys and other organs.

The majority of these cases have occurred in France and Belgium where ampoules containing 15 milligrammes (600,000 International Units) of vitamin D are available on sale without a medical prescription. In not a few cases the toxity is due to prescription.

An adequate supply of vitamin D in the body is essential for the satisfactory growth of infants and children. This vitamin is concerned with the proper absorption and utilization of calcium and phosphorus and the deposition of the salts in bone and teeth.

Under conditions where a portion of the body of infants and children can be exposed to direct sunlight for appropriate periods throughout the year, sufficient vitamin D is synthesized in the body by the action of sunlight on the skin. Where the climatic conditions are such that this does not occur for part or the whole of the year, it is necessary to give infants and children vitamin D in some form by mouth. The dosages recommended by various authorities to ensure the proper growth of infants and children vary from 400 to 1,000 International Units per day. These doses ensure optimal growth and are not accompanied by any undesirable effects.

During the last few years an alarming number of cases of toxity due to excessively large doses of vitamin D have been reported on infants and children from a number of countries. The doses given over relatively short periods of time (*e.g.*, one year) have often exceeded 10 million International Units. This has been made possible in a number of countries by the availability to the public, without medical prescription, of ampoules containing 15 milligrammes (600,000 I.U.).

These large doses lead to the deposition of calcium salts in blood vessels and other tissues and frequently to irreparable damage to the kidneys. The death rate due to this intoxication is slightly over 4 per cent in the reported cases.

Some authorities consider that a single large dose, 300,000 to 600,000 I.U., is of value in the prevention of rickets in premature infants, but that the maximum number of doses in a year should be two.

In the opinion of the committee there does not appear to be any justification for the repeated administration of many doses of this size to ensure the normal growth of infants and children.

Recommendation: The Joint FAO/WHO Expert Committee on Nutrition recommends that WHO draw the attention of governments to the dangers associated with the administration of large doses of vitamin D to infants and children and the need for widespread dissemination amongst the medical profession and public of the dangers associated with these large doses.

MALARIA CONTROL IN U.P. (NORTH INDIA)

Following the dramatic success of malaria control operations launched less than two years ago in the Terai and Bhabar tracts of U.P. (North India) the World Health Organisation has been able to suggest to the U. P. Government to undertake a low-cost campaign designed to banish malaria throughout the State within the next five to ten years, thus opening the way for fresh colonisation and increased food-production.

Throughout 1750 square miles of the Terai, stretching from the Nainital foothils to Bilaspur and from Bazpur to Khatima, a stable population of 1,50,000 plus a floating (winter) population of 45,000 is at present receiving almost 100 per cent protection from malaria through systematic DDT spraying in 1,300 villages. This is the work of a small team recruited by the U. P. Government, operating under the leadership of a WHO malaria expert from Greece, and using supplies and equipment furnished for the most part by the U. N. Children's Fund.

Microscopical examination of drops of blood pricked from the fingers of thousands of babies has revealed that, before spraying was started, from one-half to three-quarters of infants in the area got malaria during their first year of life. After the first year of DDT spraying, the figure is shown to have dropped to 2·6 per cent, while after the second year, no babies at all were becoming infected. This, together with the results of other malariometric and entomological surveys, provides conclusive scientific proof of the success of the work.

Malaria control has made possible a striking improvement in the economic status of the Terai where, according to local residents, land values have almost doubled. At the same time production of food-grains has increased.

The cost of malaria control using the methods which have proved their value in the Terai is stated to be well within the means of provincial governments, and is expected to decrease per capita the larger the area included in the overall project.—*WHO Press Release.*

FIGHT AGAINST TUBERCULOSIS

A tuberculosis training centre which is to be officially opened in New Delhi will have one of the best and most up-to-date installations in India for demonstrating and teaching modern X-ray and laboratory techniques. The new centre represents an extension of the Tuberculosis Association of India's existing clinic in the Irwin Hospital Compound, and will be housed next door in a brand-new two-story building erected from a grant from the Government of India. Both centres will continue to be under the overall direction of Dr. B. K. Sikand.

The X-ray and laboratory equipment for the new centre, including a mobile unit for miniature mass-radiography, is provided by the U.N. Children's Fund (U.N.I.C.E.F.) and has already been installed under the supervision of World-Health Organisation experts.

The World Health Organisation has provided an international team consisting of a bacteriologist, an epidemiologist, a laboratory and X-ray expert and a public health nurse to work during the first year of the centre's operation with a full local counterpart team provided by the Tuberculosis Association of India.

As well as lectures, the training will comprise practical work in the laboratory, in the clinic, and in patients' homes. The methods taught are stated to have three principal aims: (*i*) To continue and expand home treatment services and supervision for patients unable to go into a sanatorium. This treatment is designed primarily to prevent infection being passed on to other members of patients' families and communities; (*ii*) To determine exactly the extent and gravity of the tuberculosis situation in both urban and rural communities; and (*iii*) To protect young people against infection by giving BCG vaccination.

Using the mobile X-ray unit, it is said to be possible very rapidly to sift whole communities for the presence of chest disease. Already 4,000 staff and students in Delhi hospitals and other institutions have been examined while in recent months the unit has been operating in Faridabad where 16,000 of the town's 27,000 population have been X-rayed up to the present.

A similar demonstration and training centre is operating with international assistance in Trivandrum, while a third is expected to open in Patna early in the new year.—*WHO Press Release.*

INAUGURATION OF INSTITUTE OF OPHTHALMOLOGY, ALIGARH

The Hon'ble Rajkumari Amrit Kaur, Minister of Health, Government of India, while inaugurating the Institute of Ophthalmology at Aligarh University on January 3, 1952, said:

"Experts have estimated that the number of blind persons in India is in the neighbourhood of two million, while those who are afflicted with eye diseases of various types must be many times that figure and yet so little is done by us for the rehabilitation of this sad section of humanity. It is therefore evident that the promotion of adequate facilities for the training of doctors in the latest methods of diagnosing eye conditions and of affording relief to such patients is one of the fundamental aspects of the public health problem in our country. India has abundant clinical material and its exploitation to the fullest extent is essential in order to provide training facilities of a high order for our doctors. It is, therefore, none too early that this new Institute of Ophthalmology is being brought into existence in Aligarh and I am confident that it will play its part in developing ophthalmic teaching and research on sound lines. Indeed I sincerely trust that this Institute is but the precursor of the speedy birth of a full-fledged Medical College in this fine University.

"The Gandhi Eye Hospital and its Chief Medical Officer, Dr. Mohan Lal, have contributed a large share towards the establishment of this teaching centre. I understand that the Hospital was, from the beginning, planned for 250 beds and for the provision of postgraduate teaching facilities. It receives substantial help towards its maintenance from the Government of Uttar Pradesh, from the Hyderabad Government and from local bodies. The hospital has on its staff four specialists, including Dr. Mohan Lal and it has also, as a special feature, an Eye Bank. It is gratifying to note that the University of Aligarh is co-operating with the Eye Hospital for the establishment of the Institute. Participation of the University confers the necessary academic status on the institution and on the postgraduate course that is being started here.

"I understand that the Ophthalmic Institute will be under the charge of a distinguished Professor from abroad who will function as a Consultant to the Eye Hospital and will be

responsible for the organisation of the teaching and research programmes of the institution. While he will have direct charge of a certain number of beds, all the clinical material in the hospital will be at his disposal for developing teaching and research facilities on proper lines. The other doctors attached to the Hospital will, I am told, be appointed by the University as Lecturers in the Institute. I would like, at this stage, to point out that it is eminently desirable that India should avail herself of talent from other countries, as far as may be practicable, to promote progress in medical and other fields

" *Emphasis on Practical Training*—I would like to refer to another matter which I consider is of great importance in a postgraduate teaching centre. The tendency in our country is to place too much emphasis on the passing of examinations and thereby lose sight of the fact that the equipment of a student for the sound practice of his profession is the fundamental objective to be achieved by all teaching institutions. The new Ophthalmic Institute at Aligarh should lay adequate emphasis on the performance of the student in his day-to-day programme of studies instead of giving undue importance to the results of the final examination. An assessment of the student's worth on the basis of his performance during the whole course of his training will naturally require the provision of sound tutorial instruction and the resulting close contact between the teacher and the taught "—*Govt. India Press Release.*

CONFERENCE OF MENTAL HEALTH WORKERS

The Hon'ble Rajkumari Amrit Kaur, Health Minister, Government of India in her address at the opening ceremony of the Conference at Kanke (Bihar) said amongst other things:

"The problem of mental health has unfortunately received very little attention in our country. A mental hygiene programme designed to achieve positive mental health is perhaps the most important activity that is required to be promoted to-day in order to lessen the tensions which exist in communities, within nations and between nations themselves and which threaten to lead to consequences disastrous to mankind. As regards mental hygiene we can hardly claim to have made even a start in our country.

" The lack of workers and of suitable institutions was brought home to me in a poignant manner during the mass uprooting of humanity which occurred in 1947. Hundreds of men and women, perhaps more women than men, were partially or wholly demented by the cruel blows that they had received. Even children were suffering from nervous shock and exhaustion such as was piteous to behold. None of this humanity was beyond redemption and yet we were unable to cope with the situation in an adequate manner.

" For developing a mental health programme, therefore, provision for the training of appropriate workers should be made as early as possible. Such workers must include doctors, nurses and social workers. The Government of India's upgrading programme, which will make the mental hospitals at Bangalore and Ranchi into postgraduate training centres, should help us to begin to fulfil the need at least to some extent. At these centres provision should be made, in due course, for the training of all the three types of workers. Professor Mayer-Gross, who has been lent to India by W.H.O. as a consultant, is at present working out, along with the authorities in Mysore State, a plan for the development of the Bangalore Centre. Ranchi, I sincerely trust, will also be developed into such a training centre at no distant date. Certain questions relating to the taking over of the institution by the Government of India and the upgrading programme are now under active consideration. I understand that a training course in psychiatric nursing has been started in Ranchi and that this course has received the approval of the Indian Nursing Council. The training of social workers is equally important. It is indeed sad that to-day we have next to no hope to offer to the parents of the delinquent child. And I do not think we ought either to forget the so-called habitual criminal. There is plenty of rescue work to be done if we can provide this particular type of suffering humanity with the right kind of aids to rehabilitation.

"I recognise the urgency and importance of developing a properly organised mental health service for the community. Two main obstacles stand in the way of its establishment; one is, as in other spheres of health endeavour, lack of funds and the other is the extreme inadequacy of trained workers, which is much greater than in respect of workers for other branches of health administration. Workers in this field need an inexhaustible fund of human understanding and sympathy as well as courage. Therefore the primary need to-day is to organise training programmes for mental health workers on a sufficiently broad basis. A beginning is being made as I have briefly indicated and I do hope that the coming years will see a concerted effort on the part of the Central and State Governments to make up the present deficiencies.

UTTAR PRADESH MEDICAL COUNCIL

The following are excerpts from minutes of the meeting of the Uttar Pradesh Medical Council, held at Lucknow on December 11, 1951.

Present—Dr. A. N. Dass, M.B.B.S., DR. P. H., President, Members: G. B. Kabraji, M.B.B.S., D.G.O.; H. N. Bhatt, F.R.C.S.E.; R. S. Dixit, M.D., T.D.D., D.M.R.E.; K. B. Sen Roy, M.B.B.S.; V. S. Mangalik, M.D.; S. N. Basu, M.B.; P. S. Verma, L.M.P.; Chaudhury Hardeo Singh Verma, L.M.P.; B. B. L. Dikshit, L.S.M.F., L.O.; S. P. Gupta, M.D., D.S.; B. B. Bhatia, M.D., M.R.C.P., The Dean Faculty of Medicine Lucknow University and Dr. R. N. Shukla, M.B.B.S., Registrar.

The budget for the year 1952-53 and the revised budget for 1951-52 were passed.

Dr. H. N. Bhatt, F.R.C.S.E. was unanimously elected to represent this Council on the Board of High School and Intermediate Education.

Letter No. 2054-54/50-51, dated August 22, 1951, of the Indian Medical Association, asking for an alternative solution to prevent the issue of false medical certificates, was referred to the Standing Committee for report.

Letter No. 8726/29, dated July 17, 1951, informing the Government that Sri L. P. Meetal of Firozabad had contravened the Indian Medical Degrees Act and that his prosecution has been recommended, was read and confirmed.

Dr. B. B. Bhatia (Convener), Dr. S. N. Basu, Dr. S. P. Gupta, Dr. P. S. Verma and Dr. Chaudhuri Hardeo Singh Verma, were elected members of the Standing Committee for the year 1952.

POST-GRADUATE COURSES FOR MEDICAL MEN AND WOMEN

The Royal Institute of Public Health and Hygiene announces that the next bi-annual Course of Instruction for

the Certificate in Public Health, and for the Diploma in Industrial Health (Part I), will commence on Friday, the 21st March—and the following one on the 3rd October, 1952.

This leads to Courses for the Diploma in Public Health, and for the Diploma in Industrial Health (Part II), respectively.

(All Courses may be taken either whole-time, or part-time).

Prospectuses, enrolment forms, and full details, may be obtained from the Secretary of The Royal Institute of Public Health and Hygiene, 28, Portland Place, London, W. 1, England.

CORRESPONDENCE

The Editor is not responsible for any views expressed by contributors

SOME STATISTICAL ASPECTS OF THE ARTICLE "EPIDEMIOLOGICAL OBSERVATION ON TUBERCULOSIS IN JULLUNDUR CITY"

SIR,—In the November issue of the *J. Indian M. A.* of the last year, Dr. Nayyar has, in the abovementioned article, presented some statistical data regarding cases of Tuberculosis examined by him for a long period.

The data on Pulmonary Tuberculosis were based on cases diagnosed skiagraphically. I shall, however, draw the attention of the readers to some of the Statistical aspects of this article:—

(1) In the first 5 tables the author has presented the figures of Tuberculosis cases according to age, sex, community, whether occurring before or after partition etc., presumably with a view to study the relative incidence in relation with these factors. But, unfortunately he has used the percentage of the cases to total cases as indices to such study. This proceedure is fallacious, for it may not necessarily indicate the incidence rate in such groups. This is because of the fact that the incidence actually observed has not been referred to the particular population group to which it belongs. It will be observed that if the size of the particular population group is high, more cases are likely to come from that group and the incidence observed in this population group will appear higher than that in a group where the incidence will appear lower owing to smaller size of that population group even if the incidence rate say per 1,000 or 1,00,000 of the former group is equal to or lower than the corresponding incidence rate of the second group. In order, therefore, to show higher incidence in any group, say of a particular age group, the author should have found out the ratio between the actual incidence observed and the actual, or if this is not available calculated, population of the particular age group and would have expressed this result as a suitable rate say per 1,000 or 1,00,000. Similarly, rates for all the other groups of people should have been found out, only after doing which it would have been possible for him to compare the incidence in different groups.

The percentages shown by him shows only what was the relative preponderance of different groups of people brought before him.

(2) The paper does not offer any clear indication of the magnitude of the population (urban and rural) to which these cases may be justifiably said to belong.

(3) Although the observations were extended over several years, the author has not presented any year to year figures and, therefore, the epidemiological observation, regarding "Trend" cannot be made.

(4) The class intervals used in age does not include the class intervals existing between successive class intervals used by him, nor it has been stated whether the incidence in such class intervals were negative, although it will be observed that the total, worked up by the summation of the incidence in both the sexes of all class intervals used by him, includes also the figures of the missing class intervals. As an example of the missing class intervals, the class interval between the age of five years to below six years may be stated.

(5) No statistical analysis in details with regard to various data has been furnished with respect to non-pulmonary cases of tuberculosis. As such epidemiological observation with respect to these types of tuberculosis appears somewhat incomplete.

(6) Statistical analysis regarding relative incidence of "open" and "closed" cases, although such conditions are reversible, should have been given to help to study the infectivity of the disease, by which term wide fields of epidemiological phenomena are covered.

(7) Statistical constants should also have been used for basing the findings on rigid statistical basis.

Errors in calculations and other minor defects also exist. The table IV actually shows the post partition age and sex distibution of Tuberculosis in "Hindus" and others," I am etc.

24-9-1951,
Murshidabad.

A. DASGUPTA,
Subdivisional Health Officer,
Murshidabad.

REPLY FROM THE CONTRIBUTOR OF THE ARTICLE "EPIDEMIOLOGICAL OBSERVATION ON TUBERCULOSIS IN JULLUNDUR CITY"

I thank you very much for your decent commentry on my paper 'Epidemiological Observation on Tuberculosis in Jullundur city. May it suit you to get these things clarified by me.

Reference para 1 of letter—The clinic was primarily meant for chest cases but other non-pulmonary cases also dropped in. Many of the non-pulmonary cases went to other institutions and thus the proportionate total number of non-pulmonary cases was not available, so under such circumstances the trend of these types could not be demonstrated.

Reference para 2—All the cases above 5 years were included in next group 6-10, and all the cases above ten years were included in next group 11-20 and so on.

Reference para 3—Majority of females (1426 out of total 1862) were married (see column 5 of my paper) and the number of unmarried was too small for comparison purposes.

Reference para 4—I quite agree with you. The idea of composing the paper struck me late and not at the very beginning of work, otherwise I would have arranged according to your view, of course that would have been much better.

Reference para 5—As the facilities for culture were not present throughout the period and early concentration technique was employed, so I did not think it worthwhile to classify in this group.

Reference para 6—Many facilities in diagnosis and treatment of such cases were not available and so such survey was not taken.

Reference pare 7—I may bring to your kind notice that I was not a statistician and all this paper was prepared in hurry when I was about to leave for America for my fellowship studies. I am etc.

13-12-1951,
Jullunder City. B. R. NAYYAR.

THE U. P. EDUCATION DEPARTMENT AND TUBERCULOSIS

Sir,—It is a happy augury that the Minister of Education of Uttar Pradesh has realized the urgency of prevention and treatment of tuberculosis. As a prophylactic measure B.C.G. vaccination has been tried out far and wide. "Large scale experience on the Continent of Europe has produced convincing evidence of its effectiveness; immunity lasting for five to ten years may be obtained." To test the effect of it in the tropics a careful "follow up" is needed; the school children who have been so vaccinated should come under the observation of qualified medical men and a record of comparative morbidity and mortality among the vaccinated and non-vaccinated by the same agency should form the basis of further work in that direction. The verdict of India will be awaited with interest by the rest of the world and Uttar Pradesh is expected to make a valuable contribution to the knowledge pooled from similar experiments elsewhere. The record as suggested will incidentally be an interesting study of the usefulness of B.C.G. vaccination at a time when the school children together with the rest of their countrymen are suffering from the sequelæ of undernutrition in consequence of short supply of food-grains and from other causes.

As a curative measure, schemes are under way to build hospitals and sanatoria for the treatment of teachers and students infected with tuberculosis. Those are obviously meant for those in whom the disease is so far advanced as to make the diagnosis easy. At this stage the majority of the victims pass into the group of incurables. "In Wales in 1939, of every five definite cases of pulmonary tuberculosis seen for the first time in clinics, only one was in the early and essentially curable stage of the disease, whilst two were intermediate and two were advanced. The result of this dealyed ascertainment was that nearly half of those diagnosed that year, died within twelve months of first examination. Figures for England and Scotland differed hardly at all." These remarks come from a part of the world where mass miniature radiography is employed as an aid to diagnosis. "Better ascertainment with earlier diagnosis" should be the watchword of those who are responsible for the health of school children in particular. With the recognition of necessity of their all-round development more attention should be paid to the School Health Service in order to make it efficient. Its improvement and expansion should be commensurate with the rapid rise in the number of school children. In advanced countries it is this Department which is primarily responsible for health protection. The continuity of this protection, beginning from childhood (even before children are born) to old age should be assured as it is a matter of national importance. There should be a close co-operation between the medical personnel and the teaching staff.

A consideration of the problem of tuberculosis will be incomplete if no thought is given to the rehabilitation of the inmates of tuberculosis hospitals and sanatoria discharged after treatment. The majority of them are unable to resume their original occupation for physical or economic reasons. The Education Department should not rest contented with the founding of clinics, hospitals and sanatoria. It should seriously take up the question of a settlement for the rehabilitation of recovered teachers and students. Let us make an all out effort to eradicate tuberculosis by attacking the scourge from every side. I am etc.

Banaras, 14-11-51. S. K. CHAUDHURI.

DEVELOPMENT OF PUBLIC HEALTH IN BENGAL

Sir,—Importance of preventive medicine is now-a-days, appreciated with the advance of our knowledge of the causation and prevention of diseases. It is not the event of death which we want to escape but the incidence of avoidable invalidity and premature death. It is the prolongation of life and the increase in human capacity, physical and mental, which we seek to ensure.

It is wrong to think that Public Health is a concern of Government or local bodies. Public health really is an organised community endeavour to improve the quality of the population.

Let us state in brief, the important landmarks in the development of public health in our country.

In 1859, high mortality (66/1000) among British soldiers led to the appointment of a Royal commission. This commission, for the first time in India, thought about Public health men and measures. Thus, Sanitary commissioners were appointed in the centre and provinces. These officers had no administrative machinery to implement their directions, about public health.

In 1904, following the outbreak of Plague in India in 1896, the Plague commission made some recommendations for appointment of more doctors. And they were appointed in the Provincial administration for Public Health work.

After Minto-Morley Reforms (1919) Health Dept. was decentralised. Medical relief, medical education and sanitation came under the popular ministers in the provinces. Port Health Administration and research remained under central Government. In 1935 Act, this decentralisation was made more perfect.

In Bengal, first active step for public health measures was taken in 1922, by creating the posts of Dist. Health Officers in each District. The Rural Health Circles, in each thana of Bengal under the charge of a qualified Sanitary Inspector, was next created in 1927.

The District Health Officer became the supervising officer of all the Health Circles of the District. Thus public health measures reached the rural areas. In each Health Circle, besides the Sanitary Inspector there are two or three trained public health men, who are mainly responsible for the prevention and control of epidemics. While the sanitary Inspector is also responsible for food adulteration control and health education. From 1944, these Sanitary Inspectors have become Registrar of births and deaths also.

Public health matter was a concern of the local bodies so far. After 1943 famine, Government has taken direct responsibility and has expanded the Public Health Dept. to cope with the situation. The last ward in the Public Health has been said by the Health Survey and Development committee. Formed in October, 1943 by the Central Government it has made extensive study tour throughout India and has made its recommendations. It is a monumental work. For the first time, in India, it has stressed the necessity of

creating, 'Basic Doctors' who combine medical relief with preventive measures. The principles of the recommendations are the following:

(1) No individual should be deprived of adequate medical aid, irrespective of his capacity of payment.

(2) Health Services should provide fully developed laboratory and institutional facilities, necessary for diagnosis and treatment.

(3) Special emphasis to be laid on preventive aspect. Improvement of environmental hygiene is imperative.

(4) Medical relief to be given to the vast rural population.

(5) Health Services should be placed as close to the people as possible.

(6) Active co-operation of the people to be sought in developing health program.

The implementations of these recommendations are engaging the attention of all state Governments in India to-day.

Bengal has already taken a lead in this matter. Union Health Centre scheme is unique. If this scheme is implemated in letter and spirit, we have reasons to be happy. Let us hope for the best. I am etc.

Katwa, Burdwan,
West Bengal,
2-10-1951.

GOUR SEN, M.B., D.P.H.,

REVIEWS

PHARMACEUTICAL ARITHMETIC AND LATIN—By M. L. Schroff, G. P. Srivastava, P. R. Pabrai and B. M. Mithal. Published by Pindars Ltd., 7, Lower Rawdon Street, Calcutta 20. Second Edition 1951, Price Rs. 10/8/-.

This is a handy and a very useful book for students of pharmacy and would serve to remove a long-felt want of theirs. The subject of Pharmacy is gradually being developed in this country so as to come in line with similar developments in the western countries, and a text book like this, by Indian authors is likely to be well received. The authors have presented the subject with many examples already worked out and other exercises set for solution by the student. This naturally stimulates the student to independent thinking to his ultimate benefit. Discussion of too many theories, however, occasionally tends to confuse the reader. For example, the amount of cane-sugar required to make the same quantity (200 ml.) of isotonic solution is found to differ appreciably in the examples in pages 75 and 79, and these again differ from the results comparable from another example (or cane sugar solution) in p. 80. Despite such minor detractions, the book is a very serviceable one for intelligent and serious students of Pharmacy.

R. S.

A PRACTICAL HANDBOOK OF MIDWIFERY AND GYNAECOLOGY—By W. F. T. Haultain and Clifford Kennedy. Revised 4th edition, 1952. E. & S. Livingstone Ltd., Edinburgh. 412 pages with 47 illustrations. Price 24s. net.

This neat little handbook has run into four editions within a few years, a fourth edition being necessary within four years of the previous one. This shows the popularity enjoyed by, and the usefulness of, this practical handbook. This book is not meant to function as a regular text book but is written well to serve as a handbook for purposes of revision by students going up for their final examinations. This book will also serve as a useful stand-by for practitioners who have often to undertake some amount of obstetric and gynæcological work. The subjects have been dealt with, spread out in 25 convenient chapters with emphasis on practical hints wherever necessary. The items of "case-taking" and conduct of labour should be of particular help to the examinee and the practitioner; so also is the chapter on the sex-hormones. Differentiation of the importance of various points have been well-achieved by using various types of print and the liberal use of numerals. Binding, get up, and printing are very good, and not likely to strain the eyes of the examinee burning his midnight candle over this useful book.

R. S.

YOUR QUESTIONS

Correspondents should give their names and addresses (not necessarily for publication) and include all relevant details in the questions which should be typed. Questions of medical interest only will be acceptable for this section. They should be sent in a separate envelope marked "Your Questions." Questions of general interest will be published in preference. Lack of space precludes answering all the questions received.

Q. Is blood letting of any use in high blood pressure? If so, its indication and how much one should withdraw at a time? Should we replace the withdrawn blood with any other suitable fluid *e.g.*, glucose or saline by any other route other than mouth?

Ans. Blood letting as a therapeutic measure is not advocated for a patient of high blood pressure but this measure becomes a life-saving device in case of hypertensive encephalopathy or of cardiac failure due to high blood pressure. Hence as a preventive measure for these complications, if the hypertensive is a plethoric one and suffers from head symptoms, venesection may be of benefit as a temporary measure. According to some authorities a pint of blood may be taken out, at a time, and may be repeated at intervals, if necessary. No fluid replacement therapy is necessary after venesection in these cases.

Q. A young woman, 28 years old, had some sort of rash on the face and was prescribed Ung. Acidi Chrysophanici. This resulted in staining of the skin, corresponding to the areas treated on both sides of the face. In her anxiety to get rid of the mark, she peeled off the epidermis over the stain on one side. This operation was over an extensive area and not limited to the stain only. Complete healing has taken place, without any scar formation, but there has appeared brownish discoloration of the entire area where the skin was peeled off.

Can you kindly suggest anything to remove:

1. Stain of the ointment on one side, and
2. Brownish stain on the other side as result of injury.

Ans. Chrysarobin is irritant to the skin. It may produce acute erythema of the skin which may spread far beyond the part to which it is applied. It produces brownish staining of the skin which is seen in the above mentioned case. Stainings due to such medicine usually disappear without any treatment. It takes some time. To remove stain following may be tried. Daily applications of Hydrogen Peroxide. It may combined with Hydrarg-Perchlor ¼ per cent and Bismuth oxychloride 2 to 3 per cent in ointment form. Also peeling paste may be used containing Beta napthol and sulphur sublimate in 3 to 5 per cent strength. Also vitamin C—500 mgm. per dose may be injected daily for 10 to 12 days.

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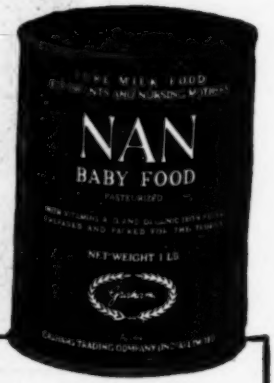

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